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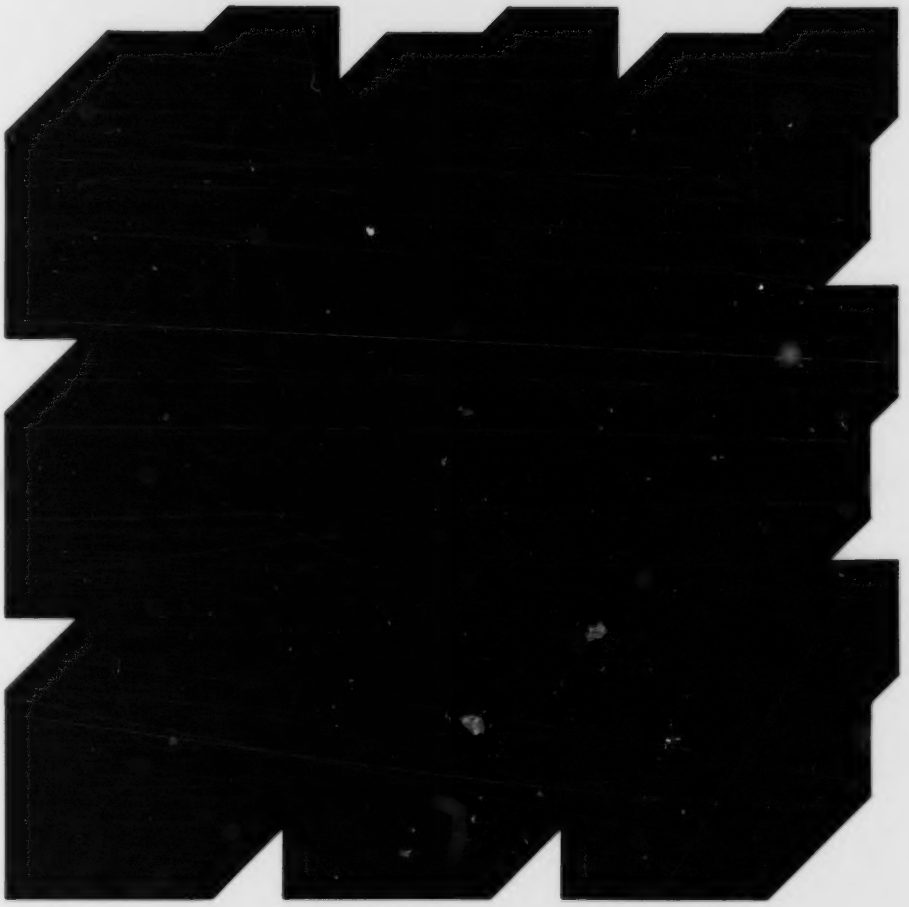

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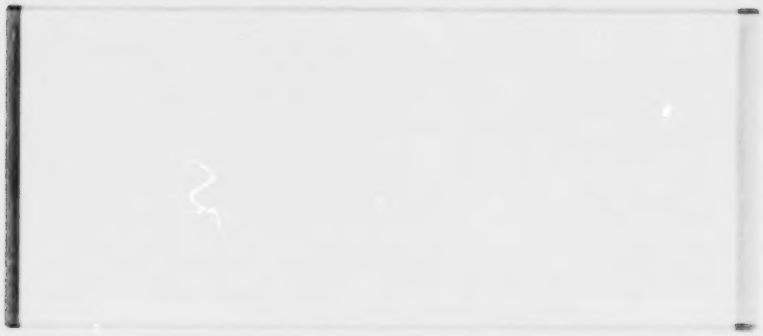

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DISCUSSION PAPER NO. 350

Pulp and Paper Modernization Grants Program - An Assessment

by

K. E. A. de Silva

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RÉSUMÉ

Toute économie évolue constamment selon des changements venant de l'extérieur ou de l'intérieur. Citons entre autres, la libéralisation des échanges, le progrès technologique, les changements dans les goûts des consommateurs et les variations du prix des facteurs, comme par exemple les augmentations des prix de l'énergie durant les années 70. Vu que les entreprises de certaines industries peuvent réagir à ces changements beaucoup moins rapidement que d'autres, des problèmes d'adaptation risquent de se produire. Dans ce contexte, il serait utile de savoir comment les politiques d'adaptation ont fonctionné dans le passé. Par exemple, l'industrie des pâtes et papiers était l'une des rares à jouir d'une politique d'adaptation conçue en fonction de ses besoins particuliers. Une analyse du Programme de modernisation de l'industrie des pâtes et papiers pourrait donc fournir des leçons utiles sur la conception et la mise en oeuvre de politiques d'adaptation.

Durant les années 70, l'industrie des pâtes et papiers a connu un ralentissement de la demande qui a fait tort à sa performance économique. La baisse du taux de croissance des exportations a été causée par une augmentation rapide des coûts qui a eu pour effet de réduire la compétitivité de l'industrie sur les marchés mondiaux. Les autorités fédérales et provinciales ont estimé alors que ces difficultés étaient attribuables à une pénurie de capitaux. Voilà pourquoi elles ont créé, en 1979, le Programme de modernisation de l'industrie des pâtes et papiers. Le programme a duré jusqu'en 1984, et environ 544 millions de dollars (courants) ont été versés en subventions durant cette période. Le principal objectif était de rehausser la compétitivité internationale de l'industrie en modernisant ses usines. La lutte contre la pollution et la conservation de l'énergie figuraient aussi comme objectifs secondaires. Toutes les régions productrices de pâtes et papiers, à l'exception de la Colombie-Britannique, ont participé au programme.

Les subventions en capital, du genre de celles qui ont été versées en vertu du Programme de modernisation de l'industrie des pâtes et papiers, sont justifiables lorsqu'il existe une imperfection dans le marché des capitaux qui empêche l'industrie d'attirer du capital. Mais les données indiquent que tel n'était pas le cas de l'industrie des pâtes et papiers. Une analyse des divers arguments invoqués en faveur du programme mène plutôt à la conclusion que celui-ci n'avait vraiment pas sa raison d'être. L'auteur se demande ici également si le programme a donné lieu à un accroissement de l'investissement qui ne se serait pas produit autrement. Or, il semble évident que l'effet du programme sur l'investissement n'a pas été appréciable. Les subventions n'ont pas non plus été versées aux vieilles usines ayant besoin d'être modernisées et qui ne l'auraient peut-être pas été autrement. Enfin, l'auteur a constaté qu'une part considérable des avantages du programme est allée aux fabricants de machines et

d'équipement, en raison d'une disposition du programme exigeant que les bénéficiaires achètent les pièces et l'équipement de sources canadiennes. Or, comme les coûts de production sont plus élevés pour les fabricants locaux de pièces que pour les fabricants étrangers, cette exigence de contenu canadien a compliqué la tâche de l'industrie des pâtes et papiers et a nui à ses efforts en vue de maintenir sa compétitivité internationale. Il ressort donc de l'étude que le Programme de modernisation de l'industrie des pâtes et papiers n'avait pas sa raison d'être, qu'il n'a pas eu pour effet d'accroître l'investissement, et que son premier objectif qui était de rendre l'industrie plus concurrentielle sur les marchés mondiaux en modernisant les usines n'a pas été atteint.

La grande leçon à tirer de l'expérience du Programme de modernisation de l'industrie des pâtes et papiers est qu'une stratégie consistant à dispenser de l'aide en capital à des entreprises particulières ou à sélectionner des bénéficiaires est nécessairement vouée à l'échec.

ABSTRACT

An economy is constantly subject to various economic changes, some generated from outside and others from within. Examples of such changes include trade liberalization, technological change, changes in consumer tastes, and input price changes such as the energy price increases during the 1970s. Since firms in some industries are able to respond to these changes much less rapidly than others, adjustment problems may occur. In this context, it would be useful to know how adjustment policies have worked in the past. The pulp and paper industry is one of the few industries which had an adjustment policy tailored to its specific needs. Hence an analysis of PPMP may provide valuable lessons regarding the designing and implementation of adjustment policies.

During the 1970s, the pulp and paper industry experienced a slowdown in demand which had an adverse effect on the economic performance of the industry. The deceleration in the growth of exports was caused by a rapid increase in costs which reduced the industry's international competitiveness. The federal and provincial governments believed that the slump in the industry was due to a capital shortage. This led to the establishment of PPMP in 1979. The program lasted until 1984 and approximately $544 million (current dollars) was spent in subsidies. The main objective of PPMP was to promote the international competitiveness of the industry through the modernization of mills. Other objectives included pollution abatement and energy conservation. All the pulp and paper producing regions, except British Columbia, participated in the program.

A capital subsidy such as PPMP can be justified if there is an imperfection in the capital market which prevents the industry from attracting capital. However, the evidence shows that this was not the case with the pulp and paper industry. Indeed, an evaluation of the various arguments advanced in favour of PPMP leads to the conclusion that there was no valid rationale for the program. The study also looked at the issue of incrementality - that is, whether PPMP led to an increase in investment which would not have occurred otherwise. The evidence indicates that the impact of the program on investment was not significant. Nor did the subsidies go to the older mills where modernization may not have been undertaken. Finally, the study found that a considerable portion of the benefits of the program spilled over to the pulp and paper machinery and equipment manufacturers. This is because of a provision in PPMP requiring subsidy recipients to purchase parts and equipment from domestic sources. Since domestic parts manufacturers have higher costs of production than

foreign manufacturers, the Canadian content requirement made it more difficult for the pulp and paper industry to maintain its international competitiveness. On balance, then, the evidence shows that PPMP had no valid rationale, was not incremental, and did little to achieve its principal objective of making the industry internationally competitive through modernization.

The main lesson to be learned from the experience with PPMP is that a strategy of targeting capital assistance to specific firms or picking winners simply does not work.

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FOREWORD

There is a substantial amount of adaptation continuously taking place in the Canadian economy as individuals and firms respond to pressures for change. In a few cases, however, these pressures are judged to impose an intolerable burden of adjustment on particular regions, industries and/or groups of workers. In these cases, governments intervene by adopting and implementing sector-specific policies.

In the research program for the Council's Manufacturing Firm Adjustment project case studies were undertaken of some of the most important examples of sectoral policies for trade-sensitive industries. This paper examines the Pulp and Paper Modernization Program, a joint federal/provincial capital subsidy program aimed at encouraging increased firm expenditures on the modernization of plant and equipment, pollution abatement and energy conservation. The central conclusion of the paper is that there was little, if any, efficiency or equity rationale for plant modernization which accounted for the lion's share of the half billion dollar program. Furthermore, the evidence indicates that little in the way of increased investment occurred because of the subsidy. The paper examines in detail the factors that may have contributed to the lack of success of the program.

The author, K.E.A. deSilva, is a member of the Council's research staff.

Judith Maxwell
Chairman

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1 INTRODUCTION

The pulp and paper industry is one of the more important industries in Canada, contributing about 1 per cent to real Gross Domestic Product and about 9 per cent to total exports in 1984. In fact, given Canada's considerable forest resources, pulp and paper has traditionally been regarded as one of the industries in which this country has a comparative advantage.[1] However, during the 1970s this industry experienced a marked deceleration in export growth. Whereas pulp and paper exports increased at an annual rate of 5.7 per cent during the 1960s, they increased at only 2.6 per cent per annum during the 1970s. It is only since 1983 that growth in the industry's exports has begun to accelerate again.

The slowing in pulp and paper export growth during the 1970s was brought about by rapidly escalating costs which reduced the international competitiveness of the industry. As a result, the industry experienced a slowdown in the growth of output, employment and productivity during the same time period. Faced with declining demand, firms appeared to be reluctant to undertake investment.

The federal and provincial governments believed that the most effective way of getting the industry back on its feet was by encouraging investment through subsidies. Accordingly, in February 1979, the federal government announced its intention of allocating $235 million (current dollars) for a modernization grants program. Subsequently, cost-sharing agreements were signed with the governments of Ontario, Quebec, New Brunswick, Nova Scotia, and Newfoundland. Between April 1979 and April 1985, approximately $544 million (current dollars) was spent by the federal and provincial governments to assist the pulp and paper industry in the areas of modernization, pollution abatement and energy conservation. The principal beneficiaries of the program were Quebec and Ontario, despite the fact that these two provinces had experienced very little productivity slowdown relative to the other regions during the 1974-79 period. British Columbia did not participate in the program. Although the program came under fire from several quarters, the governments lauded it as a success. Since 1984, modernization grants have been incorporated into the Industrial and Regional Development Program.

This study deals with the efficaciousness of the modernization grants program. It forms part of a broader Council project which deals with firm adaptation to trade pressures and opportunities in the manufacturing sector. Apart from its importance to the Canadian economy, pulp and paper is one of the few industries which received a specific adjustment assistance program tailored to its needs. Adjustment policies can be broadly defined as policies which try to facilitate the transfer of resources from declining or declining growth sectors to faster growth sectors. Although pulp and paper was not a declining sector in the sense

that its output and productivity levels did not contract, it was an industry whose growth rate was declining during most of the 1970s and the early 1980s. The modernization grants program was introduced to encourage pulp and paper firms to undertake investment with a view to improving their productivity and international competitiveness. Hence there is merit in treating the modernization grants program as an adjustment program.

This study has at least two general objectives. One is to examine the issue of whether federal policies have promoted or impeded adjustment to change. A second objective is to consider whether government should intervene at all, and if so, how its policies could be improved in order to assist adaptation and to promote productivity growth.

More specifically, the study attempts to find out the kind of problems the modernization grants program ran into in its operation and gauge the extent of success of government intervention in the process of adjustment to changing trade conditions. This type of information provides important lessons in formulating future adjustment policies. What kind of things should the government encourage and what kind of things should it stay away from? These questions are of great current interest since adjustment problems are bound to come up if the government goes ahead with free trade with the United States. Indeed, the Ontario government has recently announced its intention of choosing the pulp and paper industry as the first target of a modernization campaign.[2] This clearly demonstrates that the present study has more than an historical interest.

There are only a few studies dealing with the modernization program in the pulp and paper industry. One is by F. J. Anderson and N. C. Bonsor on The Ontario Pulp and Paper Industry: A Regional Profitability Analysis (Ontario Economic Council, 1985). The main objective of that study was to determine whether an Ontario location was a viable one for the production of newsprint and kraft pulp compared to the southern U.S. After studying the internal rates of return in the Ontario pulp and paper industry, the authors concluded that the profitability of the industry was satisfactory and that there was no need for modernization grants or any other form of capital subsidy. This was the only aspect of the modernization grants program that these authors looked at.

Another study on The Canadian Forest Products Industries: An Assessment of the Pulp and Paper Industry (Department of Regional Industrial Expansion, March 1984) contains limited information on the modernization grants program. The study offered an industry profile rather than an evaluation of the grants program. On the latter it presented an overview of the problems facing the industry and argued the case for continued government assistance.

The Department of Regional Industrial Expansion has also published a series of reports at the national and provincial

levels entitled Pulp and Paper Modernization Study (1983). The provincial reports related to Ontario, Quebec, and New Brunswick. They dealt with the progress made on each subsidiary agreement and the problems encountered. However, there was no critical evaluation of the impact of the modernization grants program.

In addition to the foregoing studies, there is an unpublished Master's dissertation by Peter Thain submitted to the University of British Columbia in April 1984. It is entitled "The Political Economy of the Pulp and Paper Modernization Program." After a lengthy discussion of the events leading to the signing of the agreements between the two levels of government and of the various aspects of the program, the author came to the conclusion that the allocation of grants was determined by political rather than economic considerations.

Thus it is clear that there is still a void in our knowledge concerning the success or failure of the modernization grants program in assisting firms to adjust to changes in the trade situation. This then is the contribution that the present study intends to make.

This study is organized in the following manner. Chapter 2 provides an industry overview. It tries to highlight the problems facing the pulp and paper industry before the introduction of the modernization grants program. Chapter 3 is devoted to a discussion of the main features of the program. Chapter 4 contains an evaluation of the program -- the factors determining the allocation of grants, the impact on the industry, the implementation process, etc. The final chapter deals with the findings of the study.

NOTES

1 H. H. Postner, Factor Content of Canadian International Trade: An Input-Output Analysis (Ottawa: Economic Council of Canada, 1975), p. 108.

2 "Ontario Pinpoints Targets for Modernization," Globe and Mail, January 19, 1988, p. B5.

2 THE PULP AND PAPER INDUSTRY OVERVIEW

INTRODUCTION

The term "forest products industry" refers to the combination of logging (S.I.C. 031), wood industries (S.I.C. 251-259) and paper and allied industries (S.I.C. 271-274). Although the characteristics and performance of these categories are quite different, there is a considerable degree of interrelationship, as can be seen from Chart 2-1.

Within the paper and allied industries, the largest component is pulp and paper (S.I.C. 271) which accounted for 78 per cent of value added in 1984 (Table 2-1). The other components in order of importance are paper box and bag manufacturers (S.I.C. 272), miscellaneous paper converters (S.I.C. 274) and asphalt and related products (S.I.C. 273). The main focus of this study is on pulp and paper. The other segments of the forest products industry will be discussed only insofar as they influence or are related to developments in pulp and paper.

The pulp and paper industry in Canada consists of some 80 firms operating 142[1] integrated and non-integrated pulp and paper mills across the country. A major trend in the forest sector has been towards increased horizontal and vertical integration in response to such diverse factors as changes in technology, capital requirements, raw material utilization and provincial forest policy.[2] Integration of raw material and manufacturing facilities has allowed increased utilization of wood residues in pulp and paper manufacture -- a practice becoming as common in eastern Canada as in British Columbia. This integration of logging, sawmilling, and pulp and paper manufacturing has tended in some respects to blur the distinction between these industries.

INDUSTRY SIGNIFICANCE

The pulp and paper industry is one of the leading industries in Canada. In 1984 it contributed approximately 1 per cent to real gross domestic product. Pulp and newsprint accounted for 37 per cent and 41 per cent respectively of the total output of the industry in 1984.[3] The remaining 22 per cent represented the contribution of paper and paperboard. Seventy-eight per cent of the industry's output was exported in 1984.[4] Newsprint was the leading export accounting for 45.9 per cent of total pulp and paper exports in 1984 followed by pulp (40.6 per cent) and paper and paperboard (13.5 per cent).[5]

All regions in Canada have a significant stake in the pulp and paper industry. Mills are located in every province except Prince Edward Island. The industry has its greatest impact on the economies of Quebec, British Columbia and the Maritimes (Table 2-2). In Ontario (as well as in Quebec) it is the largest manufacturing industry outside of the large metropolitan areas.[6]

Furthermore, nearly 50 per cent of the manufacturing capacity of the pulp and paper industry is located in communities having populations of less than 10,000 and about 90 per cent in towns and cities of less than 100,000.[7] There are over 100 pulp and paper communities in Canada, many completely dependent on the mill or mills for their existence.[8] For the geographical location of the pulp and paper mills, see Chart 2-2.

Since the 1960s, exports and real output in pulp and paper has decelerated (Table 2-3). Productivity measured in terms of output per person hour increased until about 1973 but has showed down since then. Since about the 1960s there has also been a decline in the contribution of the pulp and paper industry to total Canadian exports. But the decline is less noticeable in the industry's contribution to aggregate real domestic product and manufacturing employment. The decline in the industry's share of RDP and employment does not necessarily mean that there was a contraction in this industry's output, employment and productivity. All it means is that output and productivity in the pulp and paper industry have grown at a slower rate than in other industries and at a slower rate than during preceding periods. Hence, pulp and paper does not qualify as a declining sector.

Internationally, there has been a slowing in production in both newsprint and pulp. Within this global context, one could notice an erosion in Canada's position as a producer and an exporter of newsprint. Whereas in 1960 Canada accounted for nearly half of the world's output of newsprint, in 1984 it accounted for only about one-third of world output. In contrast, Canada's competitors, the United States and Scandinavia, experienced an increase in their relative shares (Table 2-4). In terms of world exports of newsprint, Canada's share declined from 76 per cent in 1960 to 62.5 per cent in 1984, while the shares of the United States and Scandinavia showed an increase. In the case of pulp, Canada's share of world production again declined. But its share of world exports actually increased from 24.4 per cent in 1960 to 32.6 per cent in 1983 (Table 2-4). Finally, in the category of paper and paperboard, Canada's share of world output increased between 1971 and 1983 (Table 2-5). However, because the increase was relatively minor and because this particular product category constitutes only a small proportion of total pulp and paper production in Canada, the overall conclusion of the foregoing analysis is that Canada's share of world pulp and paper output has declined from 26.2 per cent in 1970 to 21.6 per cent in 1983.[9]

TECHNICAL CHARACTERISTICS OF THE INDUSTRY

Paper production is normally a two-step process in which first, the wood is converted into pulp, and second, the pulp is converted into paper.[10] Plants in the pulp and paper industry may thus be (i) pulp mills, which produce pulp as an end-product for shipment to other paper-producing plants; (ii) paper mills which produce paper and board from purchased pulp, and sometimes from recycled

waste paper, or (iii) integrated pulp and paper mills which combine the features of both (i) and (ii).

At present, there are several types of wood pulp being produced.[11] One is mechanical pulp which is produced by such methods as grinding or milling softwood or hardwood rounds or through refining softwood or hardwood chips. Another type is the semi-chemical and chemi-groundwood pulp which is derived by applying a number of chemical and mechanical processes. A third variety called chemical pulp has two subgroups - sulphate or kraft pulp and sulphite pulp. Both of these types involve reducing hardwood or softwood to small chips and treating them with either a chemical mixture consisting of sodium sulphate and sodium hydroxide in the case of sulphate pulp or a sulphite cooking liquor in the case of sulphite pulp. In addition to these, there are other types such as dissolving pulp which can be employed in a variety of uses besides papermaking (e.g., manmade fibre, explosives, etc.) and waste paper pulp.

The foregoing categories have experienced some noteworthy changes in production during the 1975-83 period. The largest increase - 43.65 per cent - has occurred in sulphate pulp, followed by semi-chemical pulp (36.61 per cent), mechanical pulp (34.01 per cent) and chemical pulp (30.63 per cent). In contrast, sulphite pulp has lost ground falling by 13 per cent; so has dissolving pulp which has declined by 5.27 per cent.[12]

The production of paper and allied products is a highly materials-intensive operation (Table 2-6). Although labour intensity or the share of wages in gross output is 27 per cent, that figure would be considerably higher if the labour embodied in other inputs is also taken into account. Although energy intensity in gross output is low, pulp and paper is the second highest consumer of energy in Canadian manufacturing.[13] Capital intensity is also low relative to labour and materials, but it is still much higher than the averages for durable and non-durable goods industries.[14] Furthermore, the evidence seems to indicate that capital requirements for setting up new pulp and paper mills have escalated during the past decade (Table 2-7). Over some range, all of the inputs used in the production process are considered to be substitutes, thereby permitting producers to avoid substantial cost increases by using relatively inexpensive inputs for those experiencing rapid rates of price increase.[15] Table 2-8 describes the shifts in the composition of inputs and the behaviour of input prices in the paper and allied products industry during three time periods -- 1958-66, 1967-73, and 1974-80. Whereas nominal wage rates increased more rapidly than the non-labour input prices during the first two periods, exactly the opposite result occurred during the 1974-80 period, with the fastest increase taking place in energy prices. These relative price changes induced shifts in the composition of inputs as producers began to substitute the relatively inexpensive labour input for the other inputs during the 1974-80 period.

DEMAND

Among the paper products, newsprint is used as an input in the production of newspapers. In the United States (which, as shown later, is the principal market for Canadian newsprint), daily newspapers accounted for 82 per cent of total newsprint consumption in 1960. However, there has been a slight decline over time to 75 per cent in 1982.[16]

Since newsprint does not have close substitutes, one would expect its price elasticity to be relatively low. This appears to be the finding of existing research -- ranging from 0 to -0.50, according to Guthrie (1972)[17] to -0.33 to -0.49, according to Schaefer (1979).[18] For some of the other paper products, the short-run price elasticities range from -0.37 for tissue and sanitary paper to -0.89 for printing and writing paper. The long-run elasticities are much higher ranging from -0.88 for tissue and sanitary paper to -1.30 for printing and writing paper.

In some of the other uses, paper products have run into competition from substitutes. For example, paper has lost part of its packaging market to plastics, although in some instances plastics have been combined with paper to produce composite products.[19] Concern has also been expressed over the fact that electronic communications and information processing ultimately may displace some paper now used in writing, copying, printing, and business forms.[20] To date, however, electronic communications have provided high volume markets for paper use in office copiers, word processing equipment and computer printouts, thus revealing that if anything, these are really complements rather than substitutes for paper.

Overall, there has been a deceleration in the rate of growth of world consumption of newsprint (Table 2-9). Whereas world consumption increased at an annual rate of 5.1 per cent during the 1960-70 period, it grew by only 1.7 per cent per year during the 1970-80 period. Since then, the rate of growth has declined only very slightly. The United States is the largest consumer of newsprint in the world accounting for 42 per cent of the world total but its consumption growth has also experienced a decline in 1970-80, compared with 1960-70. However, for the most recent period, 1980-84, there had been an increase in its consumption growth. As regards wood pulp too, the evidence points to a deceleration in world consumption during the 1970s culminating in a contraction of its absolute level between 1980 and 1983. The United States is the world's leading consumer of wood pulp, accounting for about 50 per cent. Its consumption increased at an annual rate of 8 per cent between 1960 and 1970 but fell to -0.47 per annum during 1980-83. The European consumption has also experienced a severe deceleration during the 1970s and 1980s.

MARKETS

The pulp and paper industry in Canada is highly export-oriented, with about 76.9 per cent of real output being exported in 1984.[21] Among the individual components, newsprint is produced mainly for export. About 88 per cent of its output is exported. Approximately 90 per cent of the market pulp produced in Canada is also exported.[22] Market pulp is defined as pulp sold in the open market and this excludes pulp consumed by the producing mill or by any other mill controlled by or affiliated with the firm which owns the producing mill. By contrast, packaging paper and paperboard is highly domestically oriented, with exports representing only about 25 per cent of total shipments. The changing relative importance of the various product groups in total pulp and paper exports is summarized in Table 2-10. Particularly noticeable is the decline in the significance of newsprint and the increase in the relative shares of the other categories.

The principal market for Canadian pulp and paper products is the United States. In 1956, 87 per cent of Canadian newsprint exports reached the United States on a duty-free basis; Western Europe (including the United Kingdom) was the second largest market, accounting for 6 per cent (Table 2-11). In 1984 the United States was still the largest market for Canadian newsprint, although its share had dropped to 83 per cent. The per cent of exports to Western Europe (including the United Kingdom) has remained relatively stable. The largest increases occurred in exports to Asia and Latin America. In terms of relative shares, each of these regions today accounts for 4.5 per cent of Canadian newsprint exports.

Given the importance of the U.S. market for Canadian newsprint, it is useful to examine the sources of U.S. newsprint supply to find out from where competition is coming for Canadian producers. In 1955, 76.9 per cent of total newsprint sold in the United States originated from Canada, but by 1984, Canada's share had dropped to 56.9 per cent (Table 2-12). In sharp contrast, U.S. producers who supplied 16.9 per cent of the market in 1950 increased their share to 41.4 per cent in 1984. As for European suppliers, their share to the U.S. market actually declined from 2.9 per cent in 1950 to 1.7 per cent in 1984. Thus the main source of competition for Canadian newsprint is the United States, more specifically, the Southern United States.

Like in the case of newsprint, the U.S.-Canada trade in pulp is and always has been free of tariffs both ways. The United States was the principal market in the 1950s, accounting for 80 per cent of Canadian exports.[23] By 1984 the importance of the United States had dropped significantly; it now accounts for only 51 per cent of Canadian wood pulp exports. Western Europe (including the United Kingdom) is the second largest buyer, accounting for 22 per cent of Canadian exports, followed by Asia with 18 per cent. Japan alone accounts for 11.5 per cent of Canadian pulp exports.

Once again, like in the case of newsprint, it is useful to examine the sources of U.S. pulp supply. In 1955, 90.4 per cent of the U.S. market was supplied by U.S. producers, while another 8.1 per cent came from Canadian producers (Table 2-12). By 1981, the last year for which the data are available, the share of the U.S. producers had increased slightly to 92.7 per cent, while the share of Canadian producers had declined to 6.8 per cent. Thus Canada, which was only a marginal supplier of wood pulp in the U.S. market, experienced a further shrinking of its share in that market because of a tendency towards self-sufficiency on the part of the U.S. pulp and paper industry.

As regards paper and paperboard, there has been an increase in the share of Canadian exports to the United States from 31 per cent in 1963 to 77 per cent in 1984.[24] In contrast, the United Kingdom's share of Canadian exports had dropped from 54 per cent to 4 per cent during the same period. Trade in these products is subject to significant tariff and non-tariff barriers, but at least the tariff barriers have been declining during recent years (Table 2-13). Consequently, imports have gained an increased share of the domestic market. In 1970, imports accounted for 8.3 per cent of apparent domestic consumption of paper and paperboard products. In 1984, the relative share of imports had climbed to 16.8 per cent.[25]

TRANSPORTATION

The cost of shipping newsprint from mills to markets is an important element of total manufacturing costs for Canadian producers because pricing is usually on a delivered basis. Recent studies[26] indicate that transportation charges account for between 13 and 15 per cent of total production costs of Canadian newsprint. A study undertaken[27] by the Department of Consumer and Corporate Affairs (1981) tried to estimate the impact of an increase in transportation charges on pulp and paper prices. It found that a 50 per cent increase in transportation charges would raise the pulp and paper selling price by 4.7 per cent (without the interaction of wages and salaries with higher consumer prices) and 7.4 per cent when the interaction of wages and salaries with consumer prices was taken into account. Transportation costs are also a major factor in the differential in total manufacturing costs between Canadian and U.S. producers. The issue of international competitiveness will be taken up in a later section.

An unpublished study[28] undertaken by the Department of Regional Economic Expansion shows that the U.S. advantage in incentive railway rates has grown over time because of the differential impact of selective ex parte increases. While incentive rates to Northeastern and North Central U.S. have increased by 82 per cent from Eastern Canada and by 73 per cent from Millinocket, Maine, since 1971, the incentive rates from Southern U.S. to the Northeastern and North Central regions of the U.S. have increased by only 44 per cent.

In recent years there has been a move towards deregulation of transportation in Canada. This will lead to an increase in competition among the suppliers of transportation services, thus leading to a decline in transportation costs and prices in the Canadian pulp and paper industry. In the United States too, there has been a tendency towards deregulation which will have similar results in that country. Because of the existing free trade between Canada and the United States in newsprint and pulp, deregulation of transportation in the United States will exert further pressure on Canadian producers to adopt cost-saving techniques.

INDUSTRIAL STRUCTURE

Canadian pulp and paper companies are not generally large by world standards. Only 11 Canadian companies are included in the top 100 forest product companies in the world (Table 2-14). It is also important to note that the top 10 companies in the world include nine U.S. and one U.K. firm, all of which have subsidiaries in Canada.[29] In comparison with other industrial sectors, only five forest products companies are included in the 1986 Financial Post listing of the top 100 corporations. MacMillan Bloedel was the topmost performer in the 42nd place, followed by Domtar (44th), Consolidated-Bathurst (55th), British Columbia Forest Products (82nd), and Canfor (86th).

The extent of diversification in the Canadian pulp and paper industry is indicated by two ratios -- the Enterprise Specialization Ratio (ESR) and the Ownership Specialization Ratio (OSR). The former is the ratio of the value added by primary establishments in the pulp and paper industry to the value added by all enterprises classified to this industry. Primary establishments are those which are classified to the same industry as the enterprise which owns them. From this point of view, a high ESR for an industry means that enterprises which are primarily active in this industry tend to have little activity (as measured by value added) in other industries. Table 2-15 gives the ESR for pulp and paper. The ESR for 1980 is only 0.6015, which means that there is considerable diversification in this industry. This figure for 1980 is comparable with ESRs for several other industries such as iron and steel (0.5452), motor vehicles (0.5981) and petroleum refining (0.6358), but much lower than the ESR for distilleries (0.9149) and agricultural implements (0.9789).

Another aspect of enterprise diversification is measured by the ownership specialization ratio. It is the ratio of the value added by the primary establishments in the pulp and paper industry to the value added by all establishments classified to this specific industry. In effect, it measures the degree to which establishments classified to an industry are controlled by enterprises whose primary activity is in that industry. Although OSR in pulp and paper has declined a little between 1970 and 1980, the figure for 1980 is in excess of 0.80 which indicates that the

industry is dominated by firms whose primary activity is pulp and paper manufacture. This figure for 1980 is comparable with the OSRs for several other leading industries such as iron and steel (0.8166) and petroleum refining (0.8421).

The main focus of attention in the rest of this section is on barriers to entry. Dale Orr (1974) presented evidence on entry barriers for 71 three-digit manufacturing industries including pulp and paper. To construct an "index of overall entry barriers," Orr used an equation with several explanatory variables of which only five were found to be statistically significant. They are capital requirements for entry, advertising intensity, research and development intensity, industrial concentration, and risk which was represented by the standard deviation of industry profit rates. The dependent variable was the average number of new firms per year to enter the industry.

Using the results of the above equation, Orr was able to list the top 21 industries according to the height of entry barriers. Pulp and paper ranked 16th, behind such industries as petroleum refineries and iron and steel (Table 2-16). Of the five variables mentioned earlier, capital requirements had the most significant impact on pulp and paper, judging by the fact that this industry ranked third in the overall list in terms of this particular variable. Real capital costs per ton of capacity have increased since 1974 and this would induce a tendency towards increased concentration in the pulp and paper industry. This is an industry in which intercorporate links appear to be dominant (Chart 2-3). The data on concentration ratios reveal that, although the industry is only moderately concentrated, there has been a slight increase in concentration during the 1980s, with the four largest firms accounting for 34.5 per cent of shipments in 1972 and 40.2 per cent in 1982.[30] Several caveats are in order. First, the above concentration ratios are based on the assumption that firms produce to the Canadian market whereas the more appropriate assumption to use is the North American market. This would involve taking into account not only production on both sides of the border but also inter-corporate links between Canadian and U.S. firms. A rough estimate was made by calculating the share of the top four firms in the United States in total sales of pulp and paper in North America.[31] This worked out to 31 per cent for 1977, which is slightly lower than the 35 per cent estimated as the four-firm concentration ratio in Canadian pulp and paper for the same year.

Second, the concentration ratios mentioned earlier deal with the pulp and paper industry as a whole and do not apply to individual components. In newsprint, there has been an increase in concentration from 54 per cent in the fifties and sixties to 63 per cent in 1981, whereas pulp has experienced a reduction in concentration (Table 2-17). Concentration in other paper and paperboard is generally higher than in newsprint and pulp and has remained relatively stable over time (Table 2-18).

One should also note the extent of Canadian ownership in the pulp and paper industry. In 1970, Canadian ownership accounted for 52.2 per cent of the value of shipments (in current dollars), whereas in 1981 it had increased to 69.9 per cent. In other words, roughly a third of the value of shipments in 1981 was accounted for by foreign enterprises. According to some observers, the presence of foreign enterprises in an industry may provide a valuable stimulus to competition.[32]

Economies of scale constitute another important barrier to entry. Orr (1974) recognized the importance of this variable but had to exclude it from his analysis because of its high correlation with concentration and capital requirements. The larger the economies of scale, the more an entrant's output will depress industry price, given any elasticity in industry demand, if he enters at minimum efficient scale. A necessary but not a sufficient condition for this to hold is that established firms maintain their output in the face of entry. Thus, economies of scale increase the ability of existing firms to raise prices without making entry profitable.

Some, but not all, of the existing econometric studies[33] seem to suggest that economies of scale are not very significant in pulp and paper. However, some other studies which have examined the pulp and paper industry in considerable detail offer a different viewpoint. For example, Thain (1984)[34] cites some Swedish evidence on a typical cost curve of a digester used in pulp and paper, more specifically in kraft pulp mills. His evidence reveals the existence of considerable scale economies. When capacity is 200 tonnes a day, the cost index is at 200, but when capacity is raised to 400 tonnes per day, the cost index is 150, and continues to decline as capacity is increased. When capacity is 1,000 tonnes per day, the cost index drops to 100 and remains relatively flat thereafter.

An examination of the changes in the distribution of plant sizes over a relatively long period also seems to suggest the prevalence of scale economies. A comparison of plant sizes for 1963 with those for 1983 reveals a decline in number of the smaller size plants -- that is, in all the categories employing under 200 (Table 2-19). On the other hand, the larger groups -- that is, mills employing 200-499 and 500 and more -- have experienced an increase. Thus, the minimum efficient sized plants were those employing 200-499 persons. In 1983, about 80 per cent of the plants in the industry were of minimum efficient size and over.

The foregoing scale economies are associated with plant size. There are, in addition, other sources of economies of scale at the level of the firm. Three sources of economies are distinguishable. They are economies of vertical integration, economies of multi-plant operations, and economies of multi-product operations. Of these, the empirical evidence we have been able to find relates only to economies of vertical

integration,[35] which appears to be quite significant (Table 2-20).

PRICING

Most of the research on price behaviour in the pulp and paper industry has concentrated on newsprint pricing. The aspects which have received the most attention in the literature are the structural characteristics to be incorporated in the pricing model and the key determinants of price change.

On the former issue, many of the earlier studies have used a dominant firm pricing model, according to which the price of newsprint is set by one of the larger firms and the others adhere to this price. This price is determined on a contractual basis and there is often a wide discrepancy between the contract and spot prices.[36] There is extensive evidence of price leadership until about 1950. For some 15 years prior to World War II, International Paper was generally recognized as the price leader in all but the Western region in the United States. During this same period, Crown Zellerbach, the largest Western producer, set the price in that region. Since World War II, price leadership has again been practised in newsprint, although with some significant differences. First, no single firm has consistently taken the lead in setting prices (Table 2-21). Second, several of the large newsprint firms have frequently taken the lead in initiating price changes both in Canada and the United States. Furthermore, price changes have not always been followed by all firms. Thus, the evidence suggests a shift from a dominant firm model to barometric price leadership. Scherer (1970)[37] mentions three characteristics of barometric price leadership. They are (a) the identity of the price leader changes; (b) price leaders are not always followed, and (c) the new price often just formalizes recent departures from list price. In many ways the price leader acts as a barometer of market conditions.

The price leadership issue mentioned above also has a regional dimension. As mentioned before, until the 1960s there were only two markets -- east and west. In the eastern market, for instance, the price of newsprint was equal to the New York delivered price. That was also the price which prevailed in other important cities of the Eastern North American newsprint market, such as Chicago, Boston and Philadephia. The importance of the New York price can be seen from the fact that until the 1960s, about 80 to 85 per cent of all newsprint sold in the United States was sold at the New York price. However, during the sixties the south emerged as a major producing region, and with that there was a shift away from the zonal price system based on the New York price to a system of three regional base prices -- the South, East (ihcluding mid-west) and the West. The emergence of the South in the late sixties can be seen in the prominent role played by Southland Company of Texas in price setting in 1969 and early 1970s. The appearance of several price setters is an indication of increased competition in the newsprint industry.

There were also several instances of price collusion and anti-trust action in the pulp and paper industry. The first of the anti-trust suits began immediately after the formation of the Newsprint Manufacturers Association (NPMA) in 1915 by producers in both Canada and the United States. In 1916 costs were estimated at $33 per ton while the price of newsprint was $40 per ton and rose to $65 per ton in 1917. An action under the Sherman Act resulted in a "Nolo Contendere" plea by the NPMA and a fine of $11,000.[38]

Throughout the 1920s publishers demanded more anti-trust investigations, but as the prices declined (the 1920 price of newsprint of $112.60 was not to be matched until 1952) the cries abated. In the 1930s, despite the depressed state of the industry, publishers fiercely resisted price increases and continued political lobbying in an effort to hold prices down. Their legal attack on the National Recovery Act of 1934 was apparently motivated in part by the $1.00 per ton increase in newsprint price that would have resulted. The Act was subsequently declared unconstitutional.

From the 1930s to the late 1950s, there were several prosecutions of pulp and paper producers in Canada. A large number of these law suits was brought against paperboard manufacturers resulting in convictions and fines.[39] Since the 1960s, there were fewer government prosecutions and many of them did not lead to convictions. It does, however, seem reasonable to believe that the constant investigations may have exerted some restraint on industry pricing policies. In the mean time, there has not been a sign of a significant reduction in oligopsonistic power in the pulp and paper industry, judging by the fact that American newspaper publishers still account for a very high proportion of total newsprint consumption in the U.S., as mentioned earlier. The net result of such buying power is, presumably, a lower mark-up factor for producers.

In light of the above discussion, the question arises about the type of model which is most appropriate for analyzing price behaviour in the pulp and paper industry, especially newsprint. The most commonly used model is based on mark-up pricing, where the mark-up is allowed to be determined by a number of variables including costs, demand and the exchange rate. Nautiyal and Singh (1984) have computed the size of the mark-up in the pulp and paper industry. They report mark-up factors of 1.58, 1.57 and 1.42 for newsprint, other paper and paperboard, and wood pulp respectively for the period 1955-81. These figures indicate that, at target level, the product prices are 58, 57 and 42 per cent higher than the average cost of production in the newsprint, other paper and paper board, and pulp sectors respectively.

On the question of the determinants of price behaviour in the pulp and paper industry, considerable research has been undertaken. The results of some Canadian studies are summarized in Table 2-22. The reader is warned against making strict

comparisons of these studies because of differences in the specification of models, the construction of variables, data, etc. However, some broad conclusions can be drawn from this literature.

First, the evidence on the impact of demand on prices in the pulp and paper industry as a whole is mixed. However, with regard to newsprint, except for Dagenais (1976), the other studies find that the demand effect is insignificant. This is consistent with several U.S. studies on the subject. Note, however, that during periods of sharp declines in demand, newsprint prices have declined (see Appendix).

Second, there is considerable evidence of a significant productivity effect on newsprint price through technological change. Nautiyal and Singh (1984) find that price reductions due to technological change have occurred in the newsprint and other paper and paperboard industries at a constant rate of 2.59 per cent and 4.49 per cent per annum respectively during the 1955-81 period.

Third, cost variables appear to be statistically significant in many of the models. McFetridge (1973) finds that a 10 per cent increase in current unit labour costs (as distinct from unit normal labour costs which are adjusted for long-term productivity growth) will lead to an increase in pulp and paper prices by 1 to 2.50 per cent, depending on the formulation used. Nautiyal and Singh (1984) find that pulp and paper prices are extremely sensitive to wood pulp prices, followed by labour and energy prices. Other paper and paperboard prices are most sensitive to wood pulp prices, followed by prices for energy and capital. Wood pulp prices, in turn, are affected mostly by prices of pulpwood, energy and labour, in that order.

Finally, the U.S. influence on the price determination of Canadian pulp and paper is also an important consideration, judging by the performance of the exchange rate, the U.S. price adjusted for the exchange rate, and the cost variables adjusted in a similar manner in some of the equations. Also, note that the North American operating rate, which includes both the Canadian and the U.S. rates, is significant in Dagenais' newsprint price equation.

PERFORMANCE

The four aspects of performance which this section focuses on are productivity, international competitiveness, investment, and profitability.

PRODUCTIVITY

The slowdown in labour productivity since 1973 has already been mentioned (Table 2-3). However, labour productivity is not an accurate measure of productivity because it reflects the combined

effect of factor substitution and economic efficiency.[40] A superior measure of productivity is total factor productivity which abstracts from factor substitution and concentrates solely on economic efficiency. A recent Council study[41] has estimated total factor productivity growth in the paper and allied products industry. According to it, total factor productivity growth has followed a pattern similar to the one described earlier for labour productivity growth - an increase during 1967-73 and a rapid decline in 1974-80 (Table 2-23). Thus, regardless of the measure used, productivity growth has declined during the 1974-80 period.

All pulp and paper producing regions in Canada were affected by the productivity slowdown during the 1974-79 period, but the severity of the impact varied from region to region (Table 2-24). The worst affected region was the Maritimes (and the Prairies), followed by British Columbia. The productivity deceleration in Quebec and Ontario was relatively small. In fact, in the latter two provinces, output and employment grew at a faster rate during the 1974-79 period, compared with the preceding period. However, for the entire period 1970-79, Ontario had the highest productivity growth and British Columbia the lowest. During the 1980-83 period, all regions have experienced a recovery.

The decline in productivity growth during the 1974-82 period was not unique to pulp and paper but was quite widespread. Paper and allied products was badly hit by the productivity decline, but there were others such as motor vehicle parts which were even worse off (Table 2-23).

For the sake of comparison, we have also examined productivity growth in the U.S. pulp and paper industry during the same time periods mentioned earlier. The evidence shows that the U.S. industry has also experienced a sharp decline in its productivity growth during 1974-80 similar to that in Canada, followed by a recovery during 1981-84 (Table 2-25).

There is a temptation to associate the slowing of productivity growth with capital, since investment growth also experienced a sharp decline in the latter half of the 1970s. However, the Council's research shows that the contribution of capital to the productivity slowdown in paper and allied products was relatively modest,[42] around 12 per cent (Table 2-26). Despite the fact that the paper and allied products industry is a heavy user of energy relative to other industries, the energy price increase also had only a small impact on the productivity decline -- only about 12 per cent.[43] By far the most important was the contribution of material inputs (consisting of fibre and chemicals) which accounted for 65 per cent of the productivity slowdown. This is understandable because, as previously mentioned, pulp and paper is relatively high in its material intensity. During the 1970s, as material prices experienced a sharp increase (Table 2-8), firms tried to substitute other inputs for materials, thereby leading to a contraction of output and productivity growth. In addition to these input substitution effects, labour productivity growth is

also influenced by the growth in the efficiency with which these inputs are combined or total factor productivity. The contribution of total factor productivity growth to the slowdown in labour productivity was about 11 per cent. The research undertaken at the Council[44] demonstrates that the decline in total factor productivity growth in Canadian manufacturing as well as in paper and allied products was brought about partly by a decline in technological change which in turn was indirectly caused by the energy price increase operating through the energy intensity of technological change, and partly by a reduction in the utilization of scale economies.

Many studies,[45] including Council's research, have also emphasized the dominant role played by demand factors in the productivity slowdown. The influence of demand growth on productivity growth operates through several channels. One is capacity utilization which declined from 88 per cent in 1967-73 to 82.4 per cent in 1974-82. The others are the decline in technological change[46] and a reduction in the degree to which scale economies are exploited.[47]

Nautiyal and Singh (1986) offer a somewhat different perspective on the productivity slowdown in the Canadian pulp and paper industry, using a complex model which differentiates between the short-run and the long-run equilibria and traces the adjustment of firms in the industry to the long-run equilibrium. They believe that, in addition to the slowdown in technical progress and demand, the Canadian pulp and paper industry has been slow to adjust to exogenous factors such as the energy price increase. To demonstrate this, they use simulation results to show the divergence of actual total costs from optimal total costs which would prevail when the firms have chosen the long-run least-cost combination of inputs (Table 2-27). During the 1960s, the divergence was small but it widened considerably during the 1972-82 period. This was a period which witnessed the energy price crisis. It was also a period when demand was subject to somewhat more erratic changes than during the sixties. For example, the standard deviation of capacity utilization was 7.0 during 1971-82, compared with 4.0 for the 1961-70 period; similarly, the standard deviation of export growth was 9.4 per cent during 1971-82, compared with 5.0 during 1963-70. The authors contend that because of the disruptions caused by the above factors, the pulp and paper industry experienced a considerable lag in its adjustment to its long-run least cost input combination.

Table 2-28 presents the underlying rates of productivity growth corresponding to the actual and the long-run least-cost expansion paths of the four inputs -- capital, labour, energy, and materials -- for three time-periods, 1956-62, 1963-70, and 1971-82 in the Canadian pulp and paper industry. Productivity growth of each input, except materials, on the least-cost path is lower than on the actual path during the 1963-70 period. On the other hand, the long-run least-cost growth rate of these inputs is generally higher than that on the actual path from 1971 onwards. While the

actual productivity growth rates indicate a slowdown in productivity of each of the three inputs from their 1963-70 level, the corresponding long-run growth rates indicate positive gains in productivity of the respective inputs. Also, the overall growth in productivity during the 1956-82 period is higher on the least-cost path than on the actual path, the difference being more than one percentage point for labour and capital and three percentage points for energy. As a matter of fact, positive gain in productivity of energy after 1970, and over the 1956-82 period, is observed only when the short-run adjustments are removed. According to Nautiyal and Singh, this again confirms the fact that the Canadian pulp and paper industry has been slow to adjust the input mixes to the disruptions caused by such factors as the energy price increase, and that cyclical effects have played a significant role in the productivity slowdown. Note, however, that pulp and paper is not the only industry subject to cyclical influences. Nor is it the only industry to be affected by input price changes.

Table 2-28 also shows that the productivity of materials has constantly declined during the 1956-82 period. This finding is consistent with the concern about the often alleged progressively poorer quality of wood processes by the industry. However, the rate of decline on both the actual an long-run paths appears to be slowing down.

The quality of capital also influences productivity growth. One measure of capital quality is the age of machinery and equipment. The data on the age of newsprint mills in Canada include both newsprint and groundwood specialty paper mills, whereas the data for the United States and Scandinavia refer only to newsprint mills. Generally, the groundwood specialty mills are older and smaller than other mills and if they are excluded, then the percentage of machinery and equipment of the pre-1950 vintage in Canada would be reduced. Despite this limitation of the data, the general consensus is that Canadian newsprint mills are, on average, older and smaller than those of her competitors (Tables 2-29 and 2-30). As for pulp mills, the evidence shows that a majority of them in Canada are relatively modern since they were constructed after 1960, and they account for more than 75 per cent of the total capacity of mills producing market pulp.[48]

The relationship between pollution controls and productivity growth has also received considerable attention. Air emissions and solid waste disposal were not of major concern prior to 1970 and the majority of capital expended, therefore, has been directed to abating wastewater discharges. The result was that in the period, 1969-82, the industry effected a 59 per cent reduction in total suspended solids (TSS) and a 42 per cent reduction in the discharge of Biochemical Oxygen Demand (BOD) (Table 2-31). One should also note that even before PPMP came into existence during the 1969-78 period, the industry had effected a significant reduction in pollution.

A frequent complaint made by the pulp and paper industry is that pollution controls retard productivity growth by diverting resources from productive uses. Specifically, it is claimed that increased levels of investment for pollution abatement equipment lead firms to postpone investment in productive capacity.[49] However, the evidence on this issue is mixed. According to one U.S. study,[50] pollution abatement reduced productivity growth for the U.S. economy by 0.08 percentage points a year from 1975 to 1978. A more recent study[51] on electric generation in the United States found that pollution controls had reduced productivity growth in that industry by 0.59 percentage points per year during 1973-79. A third study[52] done for the U.S. Council on Wage and Price Stability found that pollution controls did not dampen profitability, and that profit margins for corrugating medium and printing papers in the United States were sufficient for the industry to attract new capital. For Canada, a study[53] undertaken on the pulp and paper industry found that pollution controls had no effect on labour productivity growth. A more recent study[54] done for the Council on the brewing industry found tentative evidence that pollution controls have retarded productivity growth. Unfortunately, the sample used was confined to just two firms in Ontario.

There have also been frequent discussions on the role of unions in curtailing productivity growth, particularly because they can impose constraints on the way in which labour is used in the firm. Canadian pulp and paper's poor industrial relations record is cited in such discussions.

The Canadian forest products industry in general, and pulp and paper in particular, has a high rate of unionization. Between 89 and 99 per cent of production workers in pulp and paper are unionized, compared with 73 per cent for all Canadian industries and 77 per cent for manufacturing.

Strained labour-management relations have generally been a critical issue facing Canada's forest products industry. The number of person-days lost due to strikes and work stoppages has increased in the pulp and paper industry relative to the manufacturing sector in general (Table 2-32). This in turn is alleged to have has caused major disruptions in the industry, reducing output and exports. However, strikes may not always have the result of reducing output because it depends on whether or not there is excess capacity in the industry. Despite this, it is not clear what impact the unions have had on productivity growth. The evidence based on the experience of the other industries is inconclusive. The only Canadian study[55] on this subject found that unions in the manufacturing sector have both favourable and unfavourable effects, and that they tend to cancel out. In the United States, a recent study[56] came out strongly in support of the argument that unions have a relatively favourable impact on productivity.

Productivity is often associated with technical change, the final stages of which entail the adoption of "best practice." Technical change is a broad concept which includes not only invention and innovation but also diffusion. An indicator often used to represent technological change is research and development (R&D) spending. Nominal R&D spending by forest product firms in 1967 accounted for 6.5 per cent of all Canadian research undertaken by the industrial sector. But by 1975, it had dropped to 4.2 per cent and to 3.9 per cent in 1979.[57]

The evidence on the relationship between R&D and productivity is not clear cut. For example, some believe that reduced R&D spending was an important factor in the productivity slowdown in the United States,[58] while others feel its role has been exaggerated. Some even suggest that the impact was in the other direction -- i.e., that the productivity decline contributed to a decline in R&D spending.[59] There is also some doubt about the usefulness of increased R&D spending in an open economy like Canada. Some feel that more emphasis should be placed on diffusion of technology. On the latter aspect, the evidence shows that the diffusion rates have been slow in the pulp and paper industry.[60]

INTERNATIONAL COMPETITIVENESS

The decline in productivity growth together with the increase in input prices caused a sharp deterioration in the international competitiveness of the Canadian pulp and paper industry which was partly offset by the depreciation of the Canadian dollar relative to the U.S. dollar during the latter part of the 1970s. The increase in costs can best be demonstrated by an analysis of unit labour costs.

In 1970, Canada was almost on a par with the U.S. in terms of unit labour costs, measured in their respective domestic currencies. But by 1984 the situation had undergone a dramatic change in favour of the United States (Table 2-33). Whereas unit labour costs in the United States increased by 100 per cent between 1970 and 1984, in Canada it increased by 268 per cent. The increase in unit labour costs in Canada was produced by a 308 per cent increase in wages, measured in Canadian currency, combined with a 40 per cent improvement in labour productivity. In contrast, wages in the U.S. pulp and paper industry, measured in U.S. currency, increased by 218 per cent during the same period, while productivity increased by 118 per cent. Thus, 54 per cent of the relative increase in unit labour costs during the 1970-84 period can be attributed to the higher wage increase in Canada relative to the United States. The remaining 46 per cent is due to the slower productivity growth in the Canadian paper industry relative to the United States. Despite the more rapid increase in Canadian unit labour costs, the trade balance in pulp and paper products expressed in domestic currency increased by 42 per cent between 1970 and 1984. This was mainly due to the exchange rate depreciation which was noted earlier. Between 1970

and 1975, the Canadian dollar appreciated with respect to the U.S. dollar and this exacerbated the increase in unit labour costs in Canada relative to the U.S. But during the latter half of the 1970s the Canadian dollar had already declined sufficiently to offset the rise in unit labour costs. Hence at the time PPMP was introduced, the lack of international competitiveness had corrected itself to a considerable extent. Further evidence on this comes from the profit performance of the industry. Average net profits after taxes as a per cent of total assets which had declined from 8.77 per cent in 1974 to 3.25 per cent in 1977 rose again in 1978 and by 1979 had reached 9.9 per cent - its highest level during the entire 1962-79 period.

A recent study [61] has examined the impact of the depreciation of the Canadian dollar relative to the U.S. on the output, employment and profits of the Canadian pulp and paper industry over the 1962-83 period. It found that the impact of the currency depreciation was considerably greater on profits than on the other two variables. A one per cent depreciation of the Canadian currency relative to the U.S. was reported to produce more than a 2 per cent increase in variable profits (defined as measured profits plus rate of return on capital) compared with increases of 0.6 and 1.2 per cent in output and employment respectively. The greater impact on profits was the reason offered by the study to explain why pulp and paper producers favoured exchange rate depreciation.

The foregoing discussion is restricted to assessing the international competitiveness of Canadian exports to the United States. Although the United States is the largest market, accounting for about 70 per cent of Canadian pulp and paper exports, there is the remaining 30 per cent whose international competitiveness should also be examined. But before we do so, it should be mentioned that paper and allied products was not the only industry which suffered a decline in international competitiveness. Many other industries also did experience a similar decline.[62] For example, in the manufacturing sector, unit labour costs increased 131 per cent between 1970 and 1984, compared with a 91 per cent increase in U.S. manufacturing, both measured in their respective domestic currencies. But, thanks to the currency depreciation, the balance of trade in manufacturing which was in deficit in 1975 turned into a small surplus in 1981.

According to a study undertaken by the Department of Regional and Industrial Expansion in 1984, newsprint costs are lowest in Sweden and Finland, followed by the U.S. South (Table 2-34). The cost-differential between British Columbia and Northwestern United States is $8 Canadian per finished ton, while the cost differential between Quebec and Southeastern United States is $16 Canadian per finished ton. Wood costs are higher in Sweden than in any of the other countries in the sample, while Finland and Quebec are on a par in this respect. But this disadvantage is offset by the lower labour costs in Scandanavia. Manufacturing costs are lower in Quebec than in the Southeastern mills. But

when distribution costs are added on, the U.S. mills end up with a $16 Canadian cost advantage.

Until about 1980, North American producers were able to successfully compete in Europe with the Scandanavian producers. However, the Finnish mark and the Swedish krona have gone through devaluations and as a result, until recently, Canadian producers were at a cost disadvantage. The situation was aggravated by the decision of the European Economic Community to permit Scandanavian newsprint on a duty-free basis in 1984.

With regard to bleached softwood kraft pulp, too, Canadian costs were found to be higher than those of many of her competitors. Ontario has the highest costs and Sweden the lowest (Table 2-35).

Mention should also be made of two other recent international comparisons undertaken by the Forest Sector Advisory Council (FSAC). The first of those studies[63] dealing with newsprint compared costs in Canada with those in the U.S. west and the south and the three Scandinavian countries -- Finland, Norway and Sweden for two years, 1982 and 1983. For 1982, the U.S. South had the lowest delivery cost, followed by the U.S. West, Sweden and Norway. Finland had the highest delivery cost, followed by Canada. In 1983, the rankings changed a little. Canada became the highest cost producer of newsprint, followed by Finland. The other two Scandinavian countries were the lowest cost producers, followed by the U.S. West and the U.S. South.

The second study[64] which was released recently by FSAC compared the cost performance of the Canadian pulp industry with that of its competitors. The results are similar to those mentioned earlier regarding newsprint. For 1983 and 1984, Canada was the highest cost producer, while Sweden and Finland were the lowest cost producers. The United States occupied an intermediate position.

The general conclusion which emerges from the foregoing studies is that until recently Canada was the highest cost producer of pulp and newsprint of the countries we have examined. The situation seems to have shifted in Canada's favour during the last one and a half years, according to industry observers, due to the depreciation of the Canadian dollar relative to other currencies.

What explains the success of other countries in the field of international competitiveness? Some observers argue that the relatively strong international competitiveness of the pulp and paper industries in Sweden and Finland is not solely due to the devaluations of their currencies, which occurred until about 1984, but due to several other factors as well.[65] One is that, instead of shoring up the weaker firms with loans and grants, their governments have encouraged mergers of the weaker with the stronger firms. Secondly, it is claimed that the governments have provided various incentives such as subsidies and tax incentives to the stronger and more innovative firms in an effort to

stimulate their productivity and international competitiveness. However, recent evidence shows that, contrary to these claims, at least in the case of Sweden, pulp and paper was not a major beneficiary of subsidies and tax incentives. Subsidies to pulp and paper accounted for only 4.9 per cent of total subsidies paid to all industries during the 1975-82 period.[66] In dollar terms, subsidies received by the pulp and paper industry amounted to $350 million Canadian (in current dollars). Note that during the same period, 1975-82, Ontario's pulp and paper industry alone received $210 million (in current dollars) despite its much smaller size compared with the Swedish pulp and paper industry. Yet another factor sometimes mentioned in discussions of the Swedish pulp and paper industry is that the firms themselves have taken the initiative in bringing about improvements in all facets of the industry, from reforestation and R&D to marketing of final products.[67] Finally, labour is also believed to have played a very important role through participation in the affairs of the firm. As a result of labour's cooperation, firms are believed to have found it easier to introduce and implement new technologies.

INVESTMENT

The issue of investment is of great relevance to a discussion of the modernization program in the pulp and paper industry because it is widely believed that the key problems which the latter program was supposed to correct, namely, declining productivity growth and the erosion in international competitiveness are mainly attributable to the decline in investment and profitability.

Given the importance attached to capital investment, it is useful to examine the growth of real net capital stock in the paper and allied products industry. Between 1961 and 1985, the annual rate of growth of capital in this industry has experienced a decline (Table 2-36). This, however, is not unique to the paper industry. In the manufacturing sector, except for the 1967-73 period when real capital stock grew more rapidly than during the preceding period, there has also been a decline. However, the decline experienced by the paper and allied producers industry during the 1974-85 period was much more severe than that experienced elsewhere and must have also contributed to the aging of the machinery and equipment in the industry.

One reason for the decline in investment was the lower rates of capacity utilization. After experiencing relatively high rates during the 1961-67 period, the paper and allied products industry witnessed a prolonged period of low rates of capacity utilization through the 1970s and 1980s (Table 2-37). Between 1974 and 1982, the average capacity utilization rate in the paper and allied products industry was almost on a par with that in total manufacturing. But during the 1980-85 period, the capacity utilization rates in the paper industry and total manufacturing experienced a decline. Despite this decline, real output growth in the paper and allied products industry made a strong recovery. Between 1983 and 1984, real output grew at an average annual rate

of 6.65 per cent compared with 0.84 per cent for the 1974-82 period. Thus, we are led to believe that the decline in real investment was probably due to a combination of the following factors. First, despite the increase in output growth during the 1983-84 period, producers probably felt that the increase in demand could be accommodated with the existing capacity without an increase in real investment. Second, producers may have also expected the improvement in output growth to be rather temporary. Third, one should also consider the impact of real rates of interest on real investment. Average real interest rates soared to unprecedented high levels during the 1983-85 period and this must have certainly dampened the incentive to invest. However, the real issue is whether the expected profitability in the pulp and paper industry was lower than in other sectors. This is the question addressed in the next section.

PROFITABILITY

One of the most frequently heard complaints about the pulp and paper industry is that reduced profitability has discouraged producers from undertaking new investment projects. The evidence shows that during the 1962-85 period profitability in paper and allied products was generally lower than in manufacturing (Table 2-37). However, it is important to note that profitability in the paper and allied products industry had increased considerably at the time PPMP was introduced. The ratio of net profits after taxes to total assets increased steadily from a low of 3.19 per cent in 1976 to 9.87 per cent in 1979; the figure for 1980 was a healthy 10.54 per cent. In the manufacturing sector too, the ratio of net profits after taxes to total assets increased during the same period but not to the same extent as in the paper and allied products industry. In manufacturing, the profit rate increased from 5.17 per cent in 1976 to 7.18 per cent in 1979; but in 1980, it fell to 6.59 per cent. The increase in profits in the paper and allied products industry was mainly due to the decline in the value of the Canadian dollar from 101.44 cents (U.S.) in 1976 to 85.54 cents (U.S.) in 1980.

The foregoing profit rates are based on historical data on average profit rates and do not shed light on marginal profit rates which is the variable relevant for investment decisions. Moreover, they are really accounting rates of return in the sense that they are based on data on firm revenues and production and selling costs. These accounting rates of return would be an accurate gauge of the profitability of the industry if firms consider investment in pulp and paper as the best alternative available to them. Unfortunately, the accounting rates of return do not take account the opportunity cost of capital which can be defined as the benefit foregone by not using capital in its best alternative cost. To calculate opportunity costs, one must consider not only the costs of purchased inputs and selling costs but also such imputed costs as the cost of the owner's money, depreciation of capital, the evaluation of risk and special

advantages owned by firms such as a highly desirable location, patents, etc. Because of the exclusion of these imputed costs, accounting rates of return do not provide an accurate indication of the profitability of an industry. This led a recent Ontario Economic Council study by Anderson and Bonsor (1985)[68] to discard accounting rates of return and examine economic rates of return on greenfield pulp and paper investments in alternative locations to get an idea of the expected profitability in this industry during the 1980-82 period. Three regions were used in the comparison: Northern Ontario, Quebec, and Southeastern United States. For each region, the authors calculated expected before-tax and after-tax internal rates of return (IRORs) on capital expenditures in new manufacturing facilities for newsprint and kraft pulp, given existing production and transportation costs and tax systems appropriate to the region.

Although the Anderson and Bonsor study deals only with greenfield projects, the authors contend that their rates of return are also relevant to modernization projects. For example, if the rates of return on new mills are found to be higher than the economy-wide opportunity cost of capital, and if the firms choose modernization instead of setting up a new mill, then it means that the rate of return on modernization relative to the cost of capital must also be quite high, if not even higher than the rates of return on new mills.[69] The main conclusions of the Anderson/Bonsor study are the following. First, given an exchange rate of $1 Canadian = $0.82 U.S., pre-tax IRORs for pulp and paper producers located in Ontario are higher than those prevailing in Southern U.S. but lower than those prevailing in Quebec. Second, a comparison of after-tax IRORs, shows that the after-tax IRORs for an Ontario location were considerably higher than those prevailing in the Southern U.S. but lower than those prevailing in Quebec. Third, when the accelerated cost recovery system (ACRS) in the United States and the half-year depreciation convention in Canada were also included in the analysis, the authors found that an Ontario location still yields producers of newsprint and pulp higher after-tax IRORs than a Southern U.S. location and that after-tax IRORs for Quebec producers were even higher than those earned in Ontario. Finally, the study found that the IRORs were very sensitive to exchange rate movements. For example, an Ontario newsprint producer's locational advantage over a U.S. producer would be completely eradicated if the value of the Canadian dollar rose from $0.82 U.S. to $0.87 U.S. Given the depreciation in the Canadian dollar relative to the U.S. since the late 1970s, this would be a factor making Canadian locations more attractive to investors. The overall conclusion of the Anderson/Bonsor study is that the rates of return earned by Canadian pulp and newsprint producers in Ontario and Quebec are generally higher than those earned by U.S. producers in the South, and that the rates of return earned in Quebec are even higher than those earned in Ontario. On the basis of this, the authors argued that the Canadian pulp and paper industry in Ontario and Quebec did not need additional government assistance.

GOVERNMENT ASSISTANCE TO INDUSTRY

Over the years the pulp and paper industry has received considerable government assistance in a number of ways. Probably the most significant form of government assistance was tax incentives given to all industries including pulp and paper. Of these, only those which were introduced during the 1970s are mentioned here. These are important because, as mentioned below, pulp and paper was the principal beneficiary of these concessions.

On June 23, 1975, the federal government introduced a new investment tax credit which had the effect of reducing the cost of capital expenditures made after that date and before July 1, 1977. Prescribed types of buildings, machinery and equipment acquired for specified purposes were eligible for a credit against federal income taxes otherwise payable.

In December 1977 the Federal Income Tax Act was amended to provide for a tax deductible allowance in 1977 and subsequent years, amounting to 3 per cent of the value of specified inventories held at the beginning of each year. Another amendment provided for an increase and a time extension in the 5 per cent investment tax credit applicable in respect of qualified capital investments in Canada. The 5 per cent tax credit was made available for qualified investments made before July 1, 1980, but for investments made in specified geographical areas, the tax credit was increased to 7.5 or 10 per cent depending on the area.

Further federal tax changes were introduced in 1977 and provided significant amendments in respect of the tax treatment of unexpired losses of Canadian subsidiary companies. Effective with dissolutions or amalgamations commenced after March 31, 1977, these losses could be utilized by the parent or successor company, as the case may be, in the years following the commencement of dissolution or amalgamation proceedings.

To assess the impact of the above tax concessions on pulp and paper, one needs to calculate effective tax rates. The focus should be on effective marginal tax rates because the actual marginal rates may differ from statutory rates. Recently, some Council economists[70] have calculated effective marginal tax rates on income from capital in 20 two-digit manufacturing industries. These effective marginal tax rates take into account corporate, personal, and property taxes and were calculated using various assumptions. However, regardless of the assumption used, paper and allied products was found to have the lowest effective marginal tax rates in the entire manufacturing sector (Table 2-38).[71]

Another form of government assistance is export subsidization, which takes the form of credit insurance by the Export Development Corporation (EDC) and bank guarantees. A recent council study, Intervention and Efficiency (1982), found that the forest industry

was the principal beneficiary of the EDC insurance scheme during the period, 1969-80. For example, in 1980, 38.2 per cent of forest products exports was insured by EDC, compared with only 6.2 per cent for other manufacturing products.[72]

A third form of government assistance is directly made to the forest products industry under the Regional Development Incentives Program. Between 1969 and 1980, a total of $671 million (current dollars) was spent by the federal government under this program, of which more than a quarter went to the forest products industry.

Finally, the federal government has also contributed to the research programs of the pulp and paper industry under the Industrial Research Assistance Program (IRAP). In 1974-75, the pulp and paper industry accounted for 7.2 per cent of federal assistance under IRAP, but by 1981-82, its share had declined to 3.0 per cent.

CONCLUSION

The weakness of the Canadian pulp and paper industry became increasingly apparent during the 1970s as export growth experienced a marked slowdown. Whereas exports had increased at 6 per cent per year during 1960-69, they grew by only 2.5 per cent per year during 1970-79, and by 2 per cent between 1980-84.

This decline in export growth was accompanied by a corresponding deceleration in the growth of output, employment and productivity, especially during the latter half of the 1970s. One should note, however, that these changes were not unique to the pulp and paper industry, because other industries also experienced a decline in output growth, employment growth and a general slowdown in productivity.

Since the largest market for Canadian pulp and paper exports is the United States, it is useful to gauge the competition for Canadian producers. With regard to newsprint, the main competition has come from the Southern United States. As for wood pulp, Canada has been a marginal supplier in the U.S. market but her share has declined over time due to increased self-sufficiency on the part of the U.S. industry.

In 1970, the Canadian paper industry was on a par with its U.S. counterpart as far as unit labour costs was concerned. But by 1984, unit labour costs in Canada had increased much more rapidly than in the United States. However, the increase was offset to some extent by the depreciation of the Canadian relative to the U.S. dollar since the latter part of the 1970s.

Once again, however, it is important to point out that the decline in international competitiveness was fairly widespread among Canadian manufacturing industries and was not restricted to pulp and paper.

It is often claimed that the industry by itself is unable to undertake investment projects with a view to energy conservation, modernization and pollution abatement because private rates of return are too low. However, the evidence shows that profits in the paper and allied products industry had experienced a significant recovery at the time the PPMP was introduced. Moreover, a recent Ontario Economic Council study shows that the investments in pulp and paper mills located in Ontario and Quebec have enjoyed an advantage over their Southern U.S. counterparts in terms of economic rates of return net of taxes during the 1980-82 period. These calculations were made on the assumption that $1.00 Canadian = $0.82 U.S. Given the depreciation of the Canadian dollar relative to the U.S. dollar, the attractiveness of investment in Canadian pulp and paper must have increased some more relative to the U.S. during recent years.

The popular view is that inadequate capital formation has contributed to the decline in productivity growth. This is the main justification for the modernization grants program. However, research undertaken at the Council and elsewhere in Canada and abroad contradicts this view. The evidence shows that capital's contribution to producing growth was minor. In the case of pulp and paper, its contribution was about 12 per cent. The research also demonstrated that the productivity growth decline was due to factors such as the decline in demand growth and the energy price increase. Since these factors are temporary, one has reason to be somewhat optimistic regarding productivity growth in general.[73]

Finally, this chapter also examined the extent of government assistance to pulp and paper and found it to be considerable. The effective marginal tax rates on the income of capital in the pulp and paper industry is the lowest in the manufacturing sector. Similarly, this industry is also the principal beneficiary of government assistance in the field of export financing. The government has also been generous to the forest products industry under the Regional Development Incentives Program.

On the basis of the foregoing, there is reason to be skeptical regarding further government assistance, particularly in the form of subsidization of capital. This issue will be explored in more depth in Chapter 4.

NOTES

1 The actual number of establishments depends on the data source. See for example, Statistics Canada, Pulp and Paper Mills, Catalogue 36-204 Annual (Ottawa: Supply and Services Canada), June 1984; Financial Post, Pulp and Paper Annual and Directory 1981 (Quebec: Southam Business Publications), Canadian Pulp and Paper Association, 1983 Statistics (Montreal: Canadian Pulp and Paper Association), 1984. In this study, we have used the data on establishments from Statistics Canada, Pulp and Paper Mills, op. cit., p. 10; the number of firms was estimated from Pulp and Paper Annual and Directory, op. cit., p. 7.

2 See Departments of Industry, Trade and Commerce and Regional Economic Expansion, Sector Profile: The Canadian Forest Industry (Ottawa: ITC - DREE), July 1983, p. 3.

3 Based on data from Canadian Pulp and Paper Association, Reference Tables, (Montreal: CPPA) 1985, p. 7.

4 Ibid., p. 8.

5 Ibid., pp. 13, 22, and 27.

6 Department of Regional Industrial Expansion, The Canadian Newsprint Industry: An Assessment (Ottawa: DRIE), January 28, 1984, p. 2.

7 Department of Industry, Trade and Commerce, Review of the Canadian Forest Products Industries (Ottawa: ITC), November 1978, p. 58.

8 Ibid., p. 58.

9 To make these calculations, we used as weights the relative shares of pulp, newsprint, and paper and paperboard in total industry output. The data comes from CPPA, reference tables, 1985, op. cit., p. 7.

10 A major difference between Canadian and U.S. production technology is the lack of widespread use of recycled waste paper for pulp and paper production in Canada. In the U.S., about 15 million short tons of such waste paper were used in 1980. See Wood Use: U.S. Competitiveness and Technology, (Washington, D.C., Congress of the United States, Office of Technology Assessment, August 1983), p. 135.

11 The present discussion is based on Organization for Economic Co-operation and Development, The Pulp and Paper Industry (Paris: OECD, 1986), pp. 19-21.

12 These calculations are based on data contained in OECD, The Pulp and Paper Industry, 1975-76, Table 1, pp. 6-9 and OECD, the Pulp and Paper Industry, 1986, Table 1, pp. 6-7.

13 Among the pulp and paper producers in the OECD companies, Canada is tied with Italy as the lowest consumers of energy. See A. J. Ewing, Energy Efficiency in the Pulp and Paper Industry with Emphasis on Developing Countries (Washington, D.C.: World Bank), Technical Report No. 34, February 1985.

14 Capital intensity (capital as a per cent of output) figures are low because the denominator is gross output and not value added, as used in many other studies. For durable and non-durable goods industries, capital intensity in 1982 was 7.6 and 8.6 per cent, respectively. I am grateful to P. S. Rao for providing me this data, which he had constructed for his work on productivity.

15 See, for example, P. S. Rao and R. S. Preston, "Interfactor substitution, economies of scale and technical change: Evidence from Canadian industries," Empirical Economics, Vol. 9, 1984, pp. 87-111.

16 U.S. Department of Commerce, Bureau of Census, Statistical Abstract of the United States, 1984, 104th Edition, Table 961, p. 565.

17 J. A. Guthrie, An Economic Analysis of the Pulp and Paper Industry, Study No. 49 (Pullman: Washington State University Press, 1972), p. 68.

18 G. P. Schaefer, The Canadian Newsprint Industry: Econometric Models of Different Market Structures (Ottawa: Bank of Canada), Technical Report No. 17, October 1979.

19 Wood Use: U.S. Competitiveness and Technology, op. cit., p. 85.

20 Ibid., p. 85.

21 CPPA, Reference Tables, 1985, op. cit., pp. 7 and 30.

22 The Department of Regional Industrial Expansion, The Canadian Forest Products Industries: Market Pulp Industry, op. cit., p. 2

23 Ibid., p. 16.

24 Ibid., p. 29.

25 Ibid., based on data provided on pp. 9 and 26.

26 These studies are mentioned in an unpublished study by the Project Assessment and Evaluation Branch, Department of

Regional Economic Expansion, Transportation Costs in the Canadian Newsprint Industry (Ottawa: DREE), March 28, 1983.

27 N. Skoulas, Transport Costs and their Implications for Price Competitiveness in Canadian Goods-Producing Industries (Ottawa: Consumer and Corporate Affairs Canada), Research Monograph No. 9, 1981, pp. 47-8.

28 Department of Regional Economic Expansion, Transportation Costs in the Canadian Newsprint Industry, op. cit., p. 28.

29 These include Georgia Pacific, Weyerhaeuser, Bowater, International Paper, Boise Cascade, Kimberly-Clark, St. Regis, Reed International, Crown Zellerbach, and Scott Paper. Of these, Reed International is British owned. See Pulp and Paper International, Vol. 27, No. 9, September 1984, p. 54.

30 See Statistics Canada, Industrial Organization and Concentration in the Manufacturing, Mining and Logging Industries (Ottawa: Supply and Services Canada), 1972 and 1982 (Catalogue No. 31-402, biennial), p. 56.

31 The U.S. data for these calculations was taken from General Report on Industrial Organization (Washington, D.C.: U.S. Department of Commerce and Bureau of Census), April 1981, (ES77-1), p. 304.

32 Richard E. Caves, "Causes of direct investment: Foreign firms' shares in Canadian and United Kingdom manufacturing industries," Review of Economics and Statistics, August 1974, pp. 279-93.

33 For example, P. S. Rao and R. S. Preston, "Interfactor Substitution, Economies of Scale and Technical Change: Evidence from Canadian Industries," Empirical Economics, Vol 9, 1984, pp. 87-111; and B. K. Singh and J. C. Nautiyal, "Long-term productivity and factor demand in the Canadian pulp and paper industry," Canadian Journal of Agricultural Economics, March 1986, pp. 21-45.

34 P. M. Thain, The Political Economy of the Pulp and Paper Modernization Program (Vancouver: University of British Columbia, M.B.A. Dissertation (Unpublished), 1984, pp. 3-25.

35 On the other aspects, we have been able to find only some anecdotal evidence. See, for example, R. Schwindt, The Existence and the Exercise of Corporate Power: A Case Study (Ottawa: Royal Commission on Corporate Concentration), Study No. 15, 1977.

36 J. A. Guthrie, An Economic Analysis of the Pulp and Paper Industry, op. cit., pp. 166-168.

37 F. M. Scherer, Industrial Market Structure and Economic Performance (Chicago: Rand McNally College Publishing Company), 1970, p. 115.

38 G. P. Schaefer, The Canadian Newsprint Industry: Econometric Models of Different Market Structures (Ottawa: Bank of Canada), Technical Report 17, October 1979, p. 9.

39 There were altogether five cases involving Canadian paperboard manufacturers during the 1930s and 1960s. The first was in 1939 when four manufacturers of corrugated and solid fibreboard boxes operating in Toronto pleaded guilty to a charge of price fixing and fines totalling $161,500 were imposed. The second was in 1952 when a similar charge was brought against seven manufacturers of fine papers in Canada. They were fined $242,000. The third lawsuit was in 1953 when total fines of $58,000 plus costs were imposed on eight manufacturers of coarse papers in British Columbia after they had pleaded guilty to a charge of price fixing. The fourth case was in 1956 when 17 companies were found guilty of collecting industry statistics in a way which revealed the operations of individual companies. They were fined a total of $65,000. Finally, in 1962, 20 companies engaged in the manufacture and sale of paperboard shipping containers were charged for price fixing and were fined.

In 1962, there were two other cases which did not result in any action being taken. One was the acquisition of the common shares of Hendershot Paper Products Limited by Canadian International Paper Company and the other was the acquisition by Bathurst Power and Paper Company Limited of Wilson Boxes Limited. Finally, mention should also be made of a preliminary inquiry conducted by the Competition Bureau of the Department of Consumer and Corporate Affairs in 1981 to determine whether there were any contraventions of the Competition Act in the pulp and paper industry. But the inquiry was dropped in 1982 when the department was convinced that there was no wrongdoing. On the lawsuits mentioned earlier, see Lawrence Skeoch, Restrictive Trade Practices in Canada (Toronto, McClelland and Stewart, 1965), pp. 107, 114, 115, 123, 125, 139.

40 This proposition can be demonstrated in the following manner. Consider an isoquant which shows the different combinations of capital and labour used to produce a given level of output. A movement along this isoquant in either direction indicates a change in labour productivity, because the same output can now be produced with either more or less labour. But, in fact, no change in "true" productivity has occurred since there is no shift in the isoquant. Total factor productivity is an estimate of the shift in the isoquant and it does not take into account movements along the isoquant. Thus, total factor productivity is a measure of true productivity, whereas labour productivity is not.

41 P. S. Rao and R. S. Preston, op. cit., updated version (unpublished).

42 Barry Bosworth has also reported a similar finding for the United States. See Barry P. Bosworth, "Capital Formation and Economic Policy," in Brookings Papers on Economic Activity, 1982, Vol. 2, pp. 273-326.

43 It is important to point out that, at least for the United States, economists disagree as to the size of the impact of energy price increase on productivity growth and the precise channels of causation. At one end of the spectrum, some analysts believe that the increase in energy prices may have reduced labour productivity growth by as little as 0.1 or 0.2 percentage points between 1972 and 1976. At the other end, some believe that it accounted for at least 0.7 percentage points of the productivity growth slowdown. For a study supporting the latter viewpoint, see Dale Jorgenson and E. A. Hudson, "Energy Prices and the U.S. Economy, 1972-76," DRI Review, September 1978, pp. 1.24-1.37. On the former view, see George Perry, "Potential Output: Recent Issues and Present Trends," in Centre for the Study of American Business, U.S. Productive Capacity: Estimating the Utilization Gap, working paper no. 23, 1977, pp. 6-13.

44 P. S. Rao and R. S. Preston, Inter-Factor Substitution and Total Factor Productivity Growth: Evidence from Canadian Industries, Discussion Paper No. 242 (Ottawa: Economic Council of Canada, September 1983), Table 6, p. 39.

45 For example, according to G. Stuber, 25 per cent of the post-1973 productivity slowdown can be attributed to demand. See G. Stuber, "The slowdown in productivity growth in the 1975-83 period: A survey of possible explanations," Technical Report No. 43, Bank of Canada, 1986; for a comprehensive survey of the literature, see Andrew Sharpe, Explanation for Productivity Slowdown, Department of Finance, 1984, unpublished. It is also worth mentioning that in a recent study, Martin Baily has estimated the productivity growth slowdown in the United States during the 1973-83 period, compared with the 1953-73 period. The pulp and paper industry ranked seventh among the 20 two-digit manufacturing according to the severity of the slowdown in labour productivity growth and total factor productivity growth. Forty per cent of the decline in total factor productivity growth in pulp and paper was attributed to demand. Note that Baily included only two factors -- capital and labour -- in the estimation of total factor productivity growth. See, M. N. Baily, "The productivity growth slowdown by industry," Brookings Papers on Economic Activity (Washington, D.C.: Brookings Institution), 2, 1982, pp. 423-459.

46 The positive association between innovation and demand is called the "Schmookler Hypothesis" in the literature. A

recent test and confirmation of this hypothesis is found in F. M. Scherer, "Demand Pull and Technological Innovation: Schmookler Revisited," Journal of Industrial Economics, vol. 30, no. 3 (March 1982), pp. 225-237.

47 In addition to these, several other demand effects have also been mentioned in the literature. One is that increases in demand generate a more efficient allocation of resources. It has been argued that in Britain, for instance, adjustment to economic changes was much more rapid during the sixties, when demand was rising, than during the seventies. See G. D. N. Worswick, "The Relationship Between the Pressure of Demand and Productivity," in R. C. O. Matthews (ed.), Slower Growth in the Western World (London: Heinemann, 1982), pp. 29-42. Also, some have claimed that a demand slowdown would lead to an increase in x-efficiency. On this, see H. Leibenstein, "X-Efficiency, Intra-Firm Behaviour and Growth," in S. Maital and N. M. Meltz (eds.) Lagging Productivity Growth: Causes and Remedies (Cambridge, Mass.: Ballinger, 1980), pp. 76-80.

48 Department of Regional Industrial Expansion, The Canadian Forest Industries: An Assessment of Pulp and Paper Industries, (Ottawa: DRIE,) March 12, 1984, p. 5.

49 For instance, Abitibi-Price stated that: "We recognize the urgent need for environmental control expenditures but we also recognize an equally urgent need to improve our cost competitiveness with producers in the U.S....We feel, however, that irreparable harm could be done to the forest products industry in Canada if it is compelled to devote too high a percentage of its available capital to environmental projects." (Company's Annual Report, 1976, p. 3.)

50 E. Dennison, "Pollution abatement program: Estimates of their effect upon output per unit input," Survey of Current Business, August 1979, Part 1, pp. 58-59.

51 Frank M. Gollop and Marc J. Roberts, "Environmental regulations and productivity growth: The case of fossil-fueled electric power generation," Journal of Political Economy, August 1983, Vol. 91, No. 4, pp. 654-673.

52 U.S. Executive Office of the President, Council of Wages and Price Stability, Price Increases and Capacity Expansion in the Paper Industry (Washington, D.C.: Council of Wages and Price Stability), Staff Report, December 1976.

53 R. A. Muller, "Econometric analysis of environment policy: Estimation of a model of the Canadian pulp and paper industry," Canadian Journal of Economics, 11, 1978, pp. 263-286.

54 W. A. Sims and J. B. Smith, "The impact of environmental regualtion on productivity growth," Economic Council of Canada, Discussion Paper No. 241, September 1984.

55 D. Maki, "The effects of unions and strikes on the rate of growth of total factor productivity in Canada," Applied Economics, 15, No. 1, February 1983, pp. 29-42.

56 R. Freeman and J. Medoff, What Do Unions Do? (New York: Basic Books), 1984; several reviews of this book are found in Industrial and Labour Relations Review, 38, No. 2, January 1985, pp. 244-263.

57 Statistics Canada, Annual Review of Science Statistics, Catalogue No. 13-212, (Ottawa: Supply and Services Canada), various issues.

58 F. M. Scherer bases his argument on the decline in the patent rate. See F. M. Scherer, "The world productivity growth slump," Discussion Paper 11M/1P 84-25, 11M, Industrial policy, Berlin, August 1984. For an international comparison of the decline in the patent rate during the 1960s and 1970s, see Robert Evenson, "International invention: Implications for technology market analysis," in Z. Griliches (ed.), R&D, Patents and Productivity, (Chicago: University of Chicago Press) 1984.

59 Zvi Griliches, "R&D and the productivity slowdown," American Economic Review, Vol. 70, No. 2, May 1980, pp. 343-348.

60 S. Globerman, Technological Diffusion in Canadian Manufacturing Industries, Technological Innovation Studies program, Research report 13 (Ottawa: Department of Industry, Trade and Commerce) May 1974.

61 Lawrence Schembri and Richard Robicheau, "Estimating the Effect of Exchange Rate Changes On the Canadian Pulp and Paper Industry: A Dual Approach," Carleton Economic Papers (Ottawa: Carleton University, September 1986), No. 86-05.

62 They include food and beverages, petroleum products, wood, primary metals, and transportation equipment.

63 Forest Sector Advisory Council (FSAC), Newsprint Cost Study, (Toronto: Price Waterhouse Associates, June 1985).

64 Forest Sector Advisory Council (FSAC), Study of the Market Pulp Industry, (Vancouver: Price Waterhouse Associates, December 1985).

65 For example, Kimberley Noble, "Nordic Lessons" in Report on Business Magazine, November 1986, pp. 50-63.

66 Norman Bonsor, Kraft Mill Effluents in Ontario: Economic Considerations, study prepared for the Government of Ontario (forthcoming).

67 Kimberley Noble, Nordic Lessons, op. cit., p. 59.

68 F. J. Anderson and N. C. Bonsor, The Ontario Pulp and Paper Industry: A Regional Profitability Analysis, Ontario Economic Council research study, (Toronto: Ontario Economic Council, 1985).

69 Ibid., p. 20.

70 M. Daly et al., "A comparison of effective marginal tax rates on income from capital in Canadian manufacturing," Canadian Tax Journal, Nov/Dec 1985, pp. 1155-1192.

71 This contradicts the finding of a recent Conference Board study that the Canadian tax system places domestic pulp and paper companies at a competitive disadvantage, compared with the U.S., Sweden, Finland and Brazil. One of the reasons for this contradiction is that the Conference Board study analyzed only corporate taxes whereas the study by Council economists mentioned in the text looked at all taxes paid by the pulp and paper companies. See T. Zollo, J. Warda, et. al., Tax Competitiveness of the Canadian Newsprint Industry, Report 07-86H (Ottawa: The Conference Board of Canada, International Business Research Centre), April 1986.

72 Economic Council of Canada, Intervention and Efficiency, (Ottawa: Supply and Services Canada) 1982, Table 4-4, p. 53.

73 Similar views have been expressed by John F. Helliwell, among others. See John F. Helliwell, "Stagflation and the Productivity Decline in Canada, 1974-82," Canadian Journal of Economics, May 1984, pp. 191-216.

APPENDIX: HISTORY OF NEWSPRINT PRICE SETTING (1972-85)

Table 2-21 shows the history of price setting from 1950 to early 1972. In November 1972, Consolidated Bathurst raised the price of newsprint to $161 U.S. per ton for Quebec customers and to $164 U.S. per ton for Ontario customers. Although Anglo-Canadian followed suit, most did not. However, in December 1972, when Abitibi raised the price to $161 U.S. per ton and made it uniformly applicable to both Ontario and Quebec customers, others adopted the new price.

In 1973, there were several price increases. In January, Anglo-Canadian raised the price to $169 U.S. per ton, and Bowater increased it further to $175 U.S. per ton effective on July 1, 1973. In November of the same year, Canadian International Paper established a new price of $200 U.S. per ton, which was matched by Anglo-Canadian and MacMillan Bloedel. But Abitibi and Bowater were more cautious in their approach to pricing. They increased the price to $190 U.S. per ton on January 1, 1974, and announced a further increase to $200 U.S. per ton on July 1, 1974. In September 1974, Abitibi raised the price of newsprint again to $220 U.S. per ton. Although many producers announced similar increases, Canadian International Paper continued to sell newsprint at $215 U.S. per ton.

On January 1, 1975, Price Company announced that its New York price was going up to $259.65 U.S. while the price in Canada was being increased to $251.15. Later, in April 1976, the price in both countries was raised to $285 U.S. per ton. At about the same time, in July, MacMillan Bloedel increased the price on the West cost to $300 U.S. per ton, which was matched by Crown Zellerbach. In November 1976, Consolidated Bathurst established a new price of $305 U.S. per ton for the United States and a Canadian price of $291 U.S. per ton. The following year, 1977, saw some price cutting as some newsprint was sold $10-$15 below the list price of $305 U.S. per ton. This price cutting was in response to the decline in demand for newsprint.

In April 1978, Abitibi-Price raised the price of newsprint to $320 U.S. per ton, while the prices on the West Coast were being reviewed. In July 1979, the price of newsprint was raised to $345 U.S. per ton by Consolidated Bathurst and to $410 U.S. per ton by the same company on October 1, 1979. The price of newsprint continued to inch up until September 1982, when Abitibi-Price announced a sharp price increase from $436 U.S. to $468.50 U.S. per metric ton. In July 1983, Consolidated Bathurst raised the price again to $500 U.S. per metric ton, which was followed by St. Regis Paper and Bowater. But Abitibi-Price continued to charge only $468.50 U.S. There was no price increase on the West Coast during this time. On the contrary, MacMillan Bloedel, Crown Zellerbach and B.C. Forest Products announced price cuts of 5 per cent on the $468.50 U.S. price for a metric ton. By September 1983, price cutting had spread to eastern producers too,

Appendix (Cont'd.)

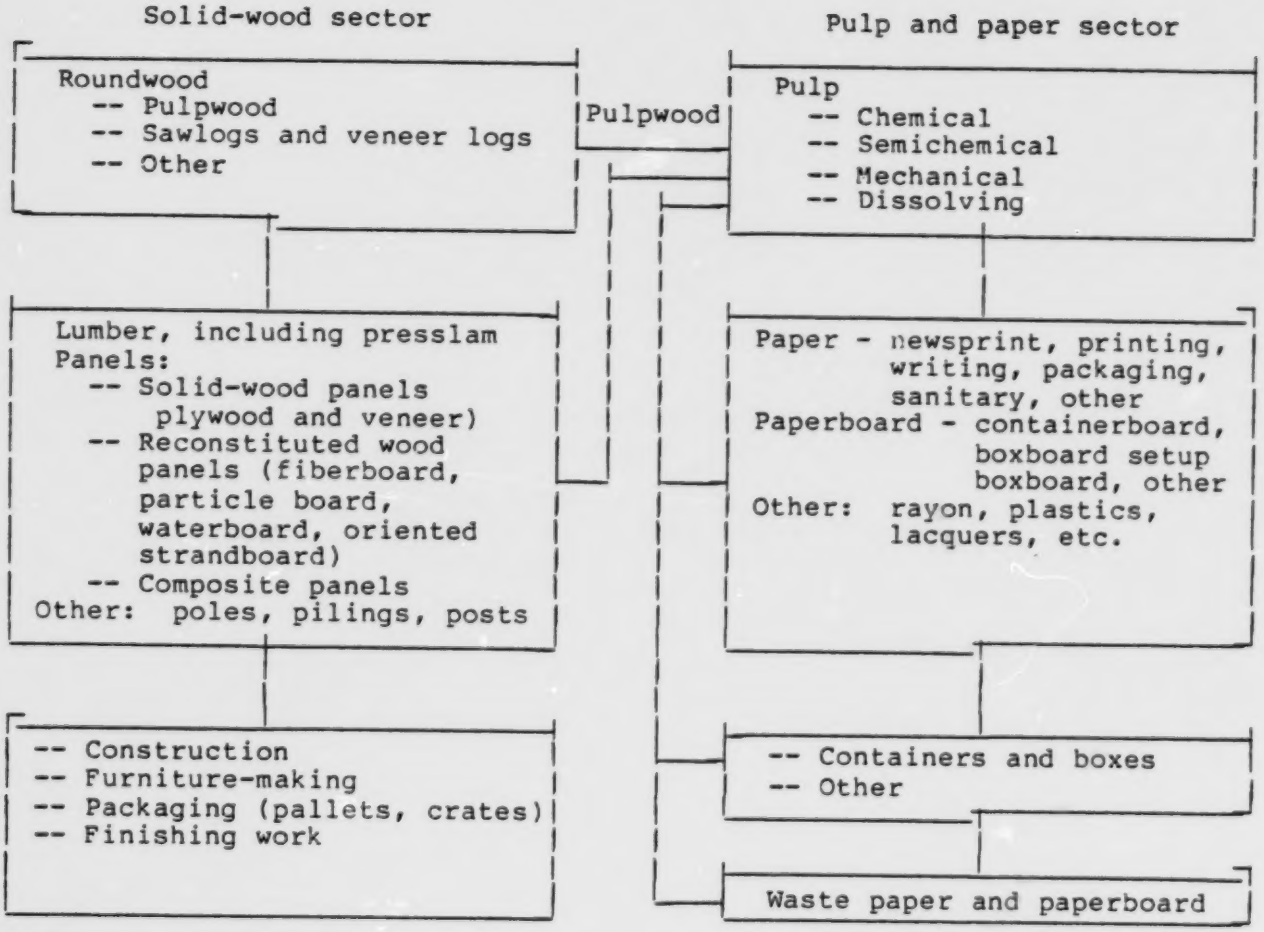
with many of them offering price cuts of $31.50 U.S. per metric ton. There was a turnaround by April 1985, when Abitibi-Price raised the price of newsprint to $570 U.S. per metric ton. Others, including Bowater and Reed, announced similar price increases.

This historical narrative shows that there was no clear price leader during the 1972-85 period. Second, western-based firms did not always follow the prices set by the eastern producers. In fact, most of the time, there was divergence in newsprint prices between east and west. Third, extreme declines in demand and slackness in the economy, such as in 1977 and 1982, triggered price decreases.

Source Based on Financial Post and Globe and Mail, various issues.

Chart 2-1

Schematic of the Forest Products Industry

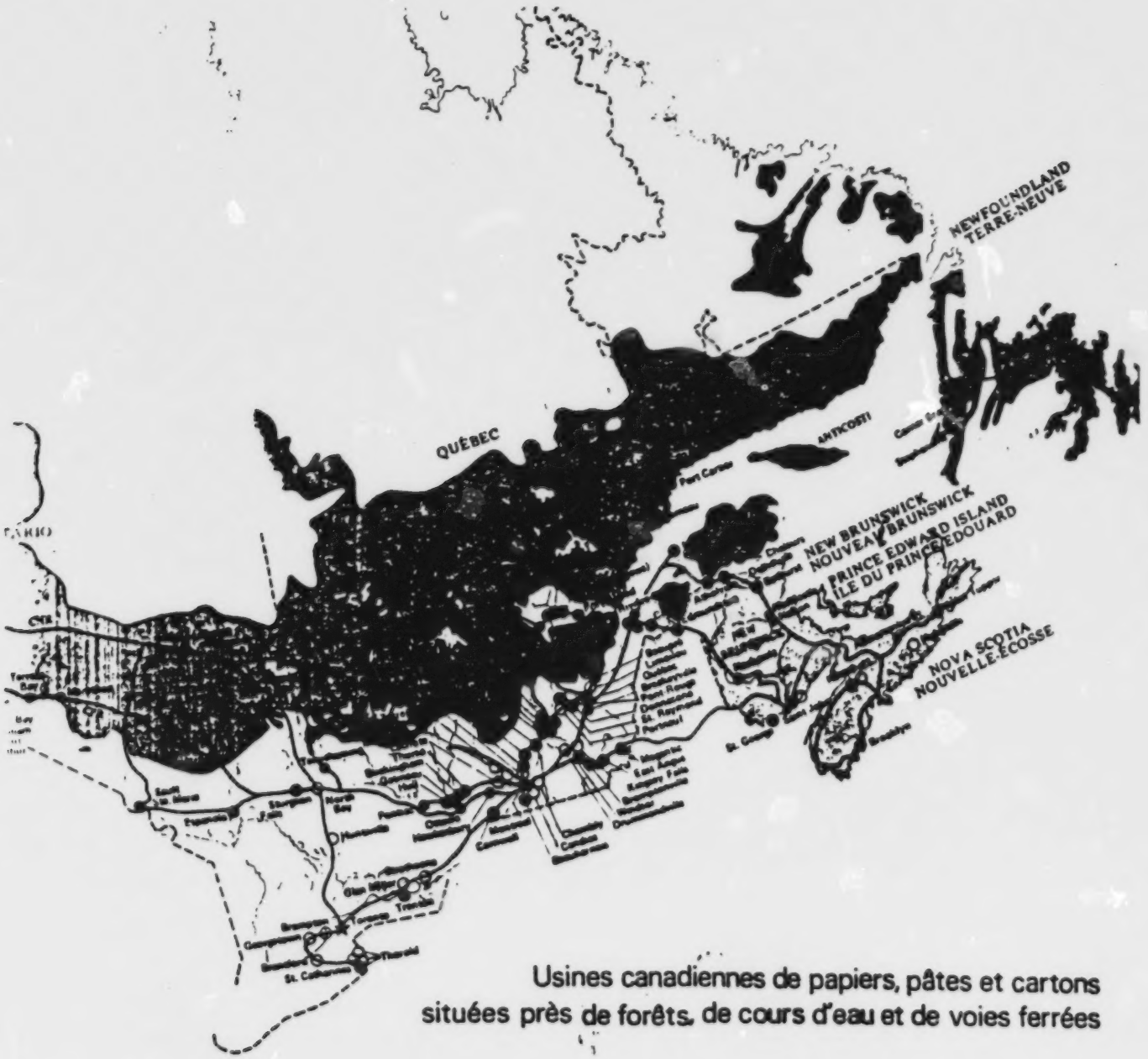


_____ Direction of fiber flow

Source Congress of the U.S., Office of Technology Assessment, Wood Use: U.S. Competitiveness and Technology (Washington, D.C., U.S.A., August 1983), p. 6.

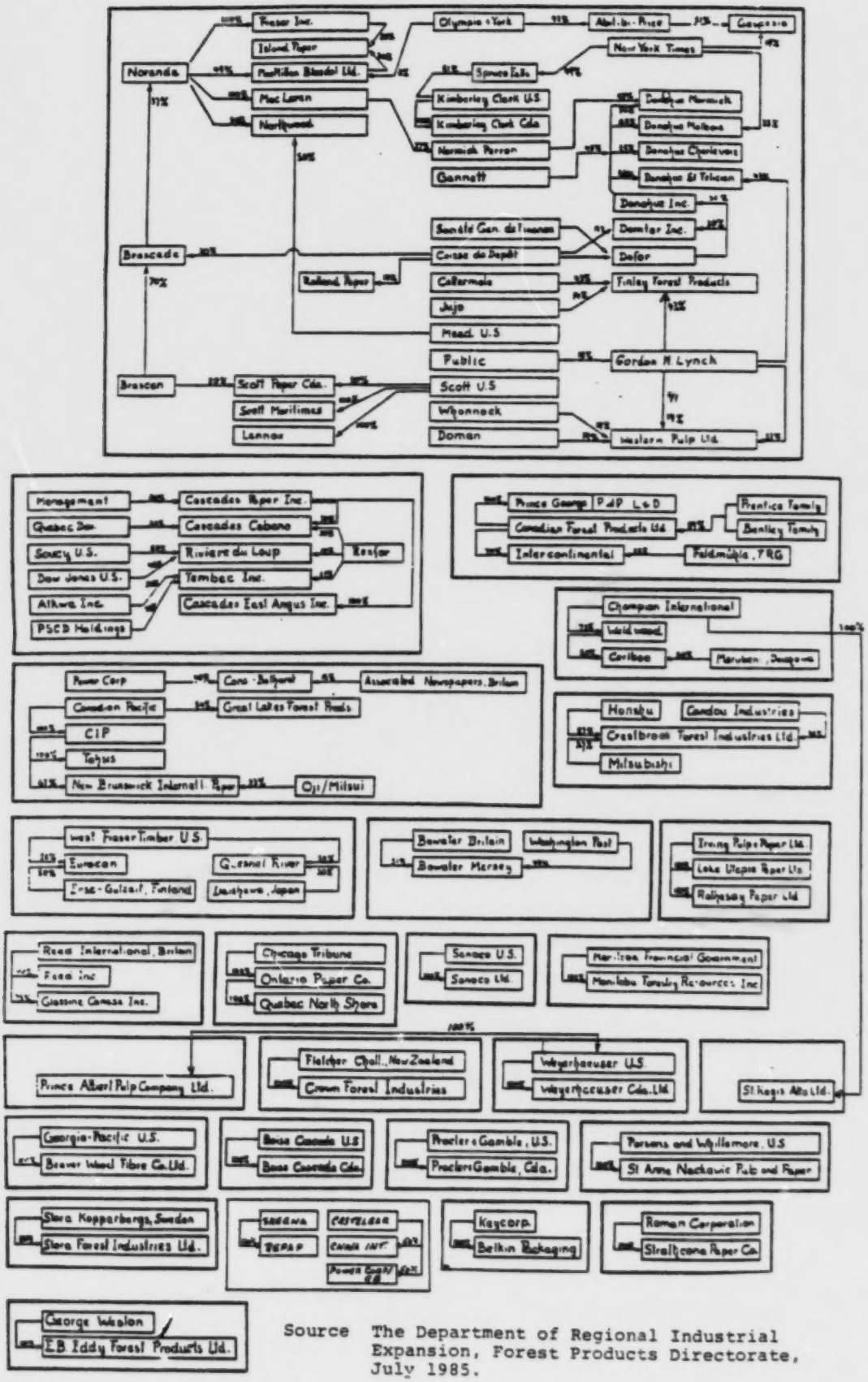
Chart 2-2

Pulp, Paper and Board Mills of Eastern Canada with Associated Wood, Water and Rail



Source The Forest Imperative, proceedings of the Canadian Forest Congress, Ontario Science Centre, September 22-23, 1980, p. 183.

Chart 2-3: PULP and PAPER INDUSTRY - INTERCORPORATE RELATIONSHIPS



Source The Department of Regional Industrial Expansion, Forest Products Directorate, July 1985.

Table 2-1

Breakdown of Paper and Allied Industries, Canada, 1984

S.I.C.	Value added	Percentage of shares
	('000 $)	
271 Pulp and paper mills	5,845,486	77.88
272 Asphalt roofing manufacturers	130,519	1.74
273 Paper box and bag manufacturers	820,738	10.93
274 Miscellaneous paper converters	708,990	9.45
Total	7,505,733	100.00

Source Statistics Canada, Manufacturing Industries of Canada: National and Provincial Areas, (Ottawa: Supply and Services Canada, November 1986), Catalogue No. 31-203, annual, p. 6.

Table 2-2

Importance of Pulp and Paper Industry, by Province, Canada, Two-Year Average, 1980-81

	Value added by pulp and paper	Percentage share of gross provincial product
	(Millions of current $)	(Per cent)
Newfoundland	178.8	4.50
Nova Scotia	208.5	3.05
New Brunswick	338.9	6.05
Quebec	1,891.2	2.57
Ontario	1,245.5	1.03
Manitoba	NA	1.0E
Saskatchewan	NA	1.0E
Alberta	92.2	0.21
British Columbia	1,283.6	3.29

E estimate.
NA not available.

Source Value added data from Statistics Canada, Manufacturing Industries of Canada: National and Provincial Areas (Ottawa: Supply and Services Canada), (Catalogue No. 31-203, Annual, 1983); Gross provincial product data supplied by The Conference Board of Canada.

Table 2-3

Economic Performance of the Pulp and Paper Industry, Canada, 1962-84

Period	Exports[1]	Output[2]	Output per person hour[3]	Year	Per cent contribution to: Aggregate RDP	Per cent contribution to: Manufacturing employment	Per cent contribution to: Total exports
	Average Annual Growth Rate (Per cent)						
1962-66	5.71	5.81	2.73	1965	1.5	4.4	16.9
1967-73	4.10	4.13	4.47	1970	1.4[a]	4.6	12.5
1974-80	2.75	2.99	1.80	1975	1.0	4.5	11.9
1981-84	0.40	-0.17	1.79	1980	1.2	4.1	11.4
1974-84	1.90	1.84	1.80	1984	1.1	4.0	9.0

a 1971 figure.

1 Exports in constant (1971) $. Nominal exports data from CPPA, Reference Tables, 1984, p. 30. Export price deflator series from Candide Data Bank.

2 Real value added. Nominal value added data from pulp and paper mills, Cat. No. 36-204 annual, 1969, 1973, 1982, and 1984. Gross domestic product deflator series from Candide Data Bank.

3 Data on person hours from Pulp and Paper Mills, Cat. No. 36-204, Annual, 1969, 1973, 1982, and 1984.

Table 2-4

World Production and World Exports of Newsprint and Pulp - Relative Shares (%), 1960-84

	Newsprint								Pulp							
	Production				Volume of Exports				Production				Volume of Exports			
	1960	1970	1980	1984	1960	1970	1980	1984	1960	1970	1980	1983	1960	1970	1980	1983
Canada	45.1	37.4	34.3	33.0	76.1	59.8	63.8	62.5	17.5	15.9	16.0	15.5	24.4	30.1	34.2	32.6
United States	13.6	14.8	16.8	18.4	1.6	1.3	1.3	2.0	38.5	37.5	36.5	36.9	10.7	16.7	16.0	15.7
North America	58.7	52.2	51.1	51.4	77.7	71.1	65.1	64.5	56.0	53.4	52.5	52.4	35.1	46.8	50.2	48.3
Finland	5.0	5.4	5.3	5.6	8.0	10.0	10.2	10.3	5.5	5.8	6.2	6.2	16.4	12.2	9.0	7.5
Norway	1.7	2.6	2.4	2.9	2.3	4.6	4.2	5.1	1.3	1.2	2.1	2.8	8.3	5.8	2.5	2.6
Sweden	4.3	4.6	6.1	5.6	5.3	6.4	10.3	9.1	6.7	6.7	7.8	9.4	30.2	22.3	14.4	14.8
Other W. Europe	16.6	12.0	8.6	8.4	3.6	2.4	2.7	3.5	12.8	9.8	4.6	2.2	12.5	5.6	7.0	8.6
W. Europe-Total	27.6	24.6	22.4	22.5	19.2	23.4	27.4	28.0	26.3	23.5	20.7	20.6	59.5	45.9	32.9	33.5
Latin America	0.9	1.3	2.0	2.5	0	0.8	0.5	1.1	1.3	1.6	4.0	4.1	0	0.9	6.2	7.2
Asia & Africa	7.4	12.5	15.9	15.6	0.8	1.4	3.6	3.1	7.4	10.8	11.1	10.8	1.7	3.0	6.6	5.3
World total (000 Tons)	13568	21170	25182	27344	7470	10375	11970	12744	59580	104772	129272	129102	9679	16847	21293	20924

Source Based on data from CPPA, Reference Tables, 1985, p. 35, 37, 38 and p. 40.

Table 2-5

World Production of Paper and Paperboard - Relative Shares (%), 1971-1983

	1971	1983
Canada	3.2	3.5
United States	41.0	36.4
Western Europe	26.7	26.1

Source CPPA, Reference Tables, 1985, p. 40.

Table 2-6

Relative Factor Shares, Canadian Paper and Allied Products Industry, 1982

	Percentage
Labour	26.6
Materials (including energy)	60.8
Capital	12.6
	100.0

Source Based on data from the CANDIDE data bank.

Table 2-7

Capacity and Capital Cost of Some Newly Constructed Newsprint Mills, Canada, 1966-82

Company/mill	Start-up	Capacity (metric tons)	Approximate capital cost ($'000,000)	Approximate cost per annual metric ton
			constant (1971)*$	
Con. Bathurst (Grand mère)	1966	110,000	19	$176
Spruce Falls (Kapuskasing)	1967	95,000	21	$225
Abitibi-Price (Grand Falls)	1968	120,000	25	$211
Donohue (Clermont)	1969	105,000	26	$250
Ontario Paper (Baie Comeau)	1970	145,000	20	$139
F. F. Soucy (Rivière du Loup)	1976	110,000	26	$230
MacMillan Bloedel (Power River)	1981	160,000	55	$337
B. C. Forest (Crofton)	1982	170,000	51	$296
Crown Forest (Campbell River)	1982	180,000	57	$321
Donohue Norwick (Amos)	1982	160,000	71	$438

* Deflated by GDP implicit price deflator for paper and allied products, the data on which is from the CANDIDE Databank.

Source Canadian Paper Analyst (Westmount, Quebec), Vol IX, March 1986, p. 8.

Table 2-8

Changes in Input Prices and the Composition of Inputs, Canadian Paper and Allied Products, 1958-79

	Input prices				Composition of inputs		
	$\dot{P}_L$	$\dot{P}_K$	$\dot{P}_E$	$\dot{P}_M$	$(\dot{K}/_L)$	$(\dot{E}/_L)$	$(\dot{M}/_L)$
	Average annual percentage change						
1958-66	4.02	2.36	-1.98	1.09	2.68	3.36	3.60
1967-73	7.71	5.99	2.98	3.20	3.40	4.02	3.73
1974-79	12.02	12.60	18.66	12.15	-0.28	1.55	0.04

Notes K, L, E, M represent capital, labour, energy, and materials respectively, and P_K, P_L, P_E, and P_M denote their respective prices.

Source P. S. Rao and R. S. Preston, Inter-Factor Substitution and Total Factor Productivity Growth: Evidence from Canadian Industries, Economic Council of Canada (unpublished), December 1982, pp. 37-40.

Table 2-9

Rate of Growth of World Consumption of Newsprint and Pulp, 1960-84

	Newsprint			Pulp		
	Annual percentage changes			Annual percentage changes		
	1960-70	1970-80	1980-84	1960-70	1970-80	1980-83*
North America	3.05	1.66	2.18	8.13	0.23	-0.51
U.S.A.	3.07	1.45	2.22	5.95	2.08	-0.47
Western Europe	3.87	0.57	1.13	6.12	1.33	-0.63
Latin America	14.55	0.94	-2.23	8.96	9.29	0.66
Africa, Asia & Oceania	10.59	3.79	2.20	15.17	3.10	0.27
World	5.07	1.67	1.52	6.73	2.24	-0.32

* 1983 is the latest year for which the data are available. Consumption measured in thousand tons of newsprint and pulp.

Source CPPA, Reference Tables, 1985, p. 36 and 39.

Table 2-10

Pulp and Paper Exports, Canada, 1956-84

	Total pulp and paper exports	Newsprint	Relative shares	
			Pulp	Paperboard
	('000 tons)		(Percentage)	
1956	7754	69.9	27.8	2.3
1969	8211	69.2	28.7	2.1
1965	10474	62.0	33.4	4.6
1970	13247	51.3	38.2	10.5
1975	12222	50.9	40.9	8.2
1980	16985	45.0	42.7	12.3
1984	17246	45.9	40.6	13.5

Source CPPA, Reference Tables (1985), pp. 15, 22, and 27.

Table 2-11

Canadian Pulp and Paper Export Markets, 1956-84
(Relative Shares - %)

	U.S.	U.K.	Western Europe	Latin America	Asia	Other countries
(a) Newsprint						
1956	87.6	5.7	0.8	3.2	0.7	2.0
1960	84.3	7.5	0.4	3.7	0.4	3.7
1965	85.1	5.3	1.0	4.5	1.5	2.6
1970	77.2	5.6	2.0	8.0	4.3	2.9
1975	80.0	6.1	2.1	7.3	2.9	1.6
1980	80.1	5.8	2.4	6.8	3.5	1.4
1984	82.9	4.7	1.8	4.5	4.5	1.6

(b) Wood pulp

	U.S.	U.K.	Western Europe	Japan	Other countries
1956	80.9	10.3	3.4	3.5	1.9
1960	76.9	10.9	5.0	0.8	6.4
1965	73.1	9.0	7.5	5.3	5.1
1970	59.4	6.8	19.2	9.3	5.3
1975	53.6	8.1	24.5	8.5	5.3
1980	48.5	5.2	26.1	12.4	7.8
1984	51.2	5.6	21.7	11.5	10.0

(c) Paper and paperboard

	U.S.	U.K.	Other countries
1963	31.3	54.1	14.6
1965	31.5	47.6	20.9
1970	38.06	29.1	32.3
1975	46.3	17.8	35.9
1980	61.3	8.1	30.6
1984	77.4	4.1	18.5

Source CPPA, Reference Tables, 1985, pp. 17, 23, and 29.

Table 2-12

Shares of the U.S. Newsprint and Wood Pulp Supplies, 1955-84

	Newsprint			Wood Pulp		
	Imports from Canada	United States production	Imports from Europe	Imports from Canada	United States production	Imports from other countries
	(Per cent)			(Percentage share)		
1955	76.9	20.8	2.2	8.1	90.4	1.5
1960	71.5	26.5	2.0	7.3	91.4	1.3
1965	71.4	25.6	3.0	7.6	91.6	0.8
1970	62.9	33.9	3.2	7.2	92.5	0.3
1975	60.9	38.7	0.4	6.5	93.4	0.2
1980	59.4	39.4	1.2	7.0	92.7	0.4
1984*	56.9	41.4	1.7	6.8	92.7	0.5

*For pulp, 1981 is the last year for which the data are available.

Source CPPA, Reference Tables, 1985, p. 30 and 35.

Table 2-13

The Level of Nominal Tariff Protection, Canadian Pulp and Paper and Manufacturing Industries, 1971-85

Year	Nominal tariff[1] all imports		Nominal tariffs,[2] dutiable imports		Percentage[3] of imports not dutiable	
	Manufac-turing	Pulp & paper	Manufac-turing	Pulp & paper	Manufac-turing	Pulp & paper
1971	7.09	8.79	15.43	13.96	54.02	36.99
1973	6.88	8.79	15.28	13.87	54.96	36.67
1975	6.65	9.74	15.10	13.75	55.94	29.14
1977	6.05	8.93	14.69	13.77	58.82	35.13
1979	5.61	7.46	14.23	13.47	60.57	44.58
1981	5.37	7.54	13.22	12.05	59.36	37.40
1983	4.90	6.21	12.52	10.55	60.88	41.12
1985	4.18	4.73	11.23	8.42	62.76	43.90

1 Defined as total duties collected divided by the total value of all imports excluding duties.

2 Defined as total duties collected divided by the total value of dutiable imports excluding duties.

3 The percentage of all imports (excluding duties) that entered Canada duty-free.

Source Special Tabulations, International Trade Division, Statistics Canada.

Table 2-14

Canadian Firms in the World's Top 100 Pulp and Paper Companies (1983)

Company	Ranking[1] 1983	Ranking[1] 1982	Sales 1983	Total assets 1983	Employment 1983
			(Million of current U.S. dollars)		
*MacMillan Bloedel	17	16	1,658.6	1719	15,472
Domtar	22	25	1,476.8	1095	15,151
Abitibi-Price	26	27	1,347.1	1379	15,000
Consolidated-Bathurst	29	30	1,215.2	1355	14,787
*Canfor	47	48	807.9	709	7,200
*British Columbia Forest Products	53	52	730.0	816	7,153
*Westar Timber	55	119	694.5	1947	12,650
Great Lakes Forest Products	83	87	401.6	588	5,598
Fraser	93	94	353.7	505	3,600
E. B. Eddy	95	99	348.9	344	4,500
Ontario Paper	96	95	342.3	429	3,165

* Western-based.

1 Ranking of firms based on current dollar sales.

Source Pulp and Paper International, (San Francisco: Miller Freeman Publications) Vol. 27, No. 9, September 1984, p. 54.

Table 2-15

Measures of Diversification, Canadian Pulp and Paper Industry, 1970-80

	Ownership specialization ratio	Enterprise specialization ratio
1970	0.9223	0.5178
1976	0.8770	0.5519
1980	0.8286	0.6015

See the text for definitions of these ratios.

Source Statistics Canada, Industrial Organization and Concentration in the Manufacturing, Mining and Logging Industries (1980) (Ottawa: Supply and Services Canada), Cat. 31-402, biennial, p. 138.

Table 2-16

The Canadian Manufacturing Industries with the Highest Entry Barriers, Early 1970s

Industry	Index of overall barriers	Rank of individual barrier of 71 industries				
		Capital requir.	Advertising	R&D	Risk	High concentration (1 if high)
Smelting and refining	2.36	1	68	27	5	1
Aircraft and parts	2.16	15	66	1	16	1
Breweries	2.00	8	5	41	24	1
Petroleum refining	1.86	2	34	28	14	1
Toilet preparation	1.70	35	1	10	21	0
Cement manufacturing	1.65	4	35	41	45	1
Iron and steel mills	1.42	5	69	29	39	1
Distilleries	1.35	12	16	49	22	1
Cotton and woollen mills	1.22	10	37	68	54	1
Tobacco products	1.11	42	6	49	71	1
Battery manufacturing	1.04	28	28	4	64	1
Pharmaceuticals	0.98	39	3	3	67	0
Motor vehicles and parts	0.93	22	25	67	3	1
Clay products	0.87	17	31	41	50	1
Major appliances	0.86	7	20	4	38	0
Pulp and paper mills	0.71	3	62	29	66	0
Agricultural implements	0.68	55	33	16	56	1
Rubber products	0.68	45	26	15	56	1
Soft drinks	0.67	25	4	49	65	0
Soap and clean compounds	0.67	67	2	10	35	0
Synthetic textiles	0.59	6	32	18	44	0
Meat products	0.58	27	55	49	62	1
Wineries	0.48	14	8	49	49	0
Small appliances	0.40	36	12	4	22	0

Source Dale, Orr, "An index of entry barriers and its application to the structure performance relationship," The Journal of Industrial Economics, Vol. XXIII, No. 1, September 1974, p. 42.

Table 2-17

Concentration in Newsprint and Pulp, Canada, 1954-1981

1954		1964		1974		1981	
Newsprint Shipments (short tons)							
Canadian International	845,000	Canadian International	905,000	Abitibi-Price	1,970,000	Abitibi-Price	1,857,000
Abitibi	771,000	Abitibi	813,000	MacMillan Bloedel/Rothesay	1,158,000	Canadian Pacific[1]	1,533,000
Consolidated	752,000	Price	750,000	Canadian International	1,101,000	Noranda[2]	1,210,000
Price	461,000	Consolidated	749,000	Consolidated-Bathurst	982,000	Consolidated-Bathurst	910,000
Powell River	378,000	MacMillan Bloedel	701,000	Ontario Paper/Q.N.S.	680,000	Ontario Paper	666,000
Sub-total	3,207,000		3,918,000		5,891,000		6,176,000
Others	2,777,000		3,383,000		3,656,000		3,665,000
Total	5,984,000		7,301,000		9,547,000		9,841,000
Share of top five companies in total shipments	54%		54%		62%		63%
Shipments of Pulp (short tons)							
Canadian International	421,000	MacMillan Bloedel	482,000	Canadian Cellulose	541,000	Canadian Pacific[1]	1,012,000
MacMillan Bloedel	277,000	Canadian International	461,000	MacMillan Bloedel	507,000	Noranda[3]	725,000
Fraser	227,000	Canadian Cellulose	345,000	Canadian International/Tahsis	503,000	B.C. Timber	450,000
Kimberly Clark/Spruce Falls	179,000	Fraser	321,000	B.C. Forest Products	458,000	Canfor	437,000
Rayonier B.C.	139,000	Rayonier B.C.	232,000	Prince Alberta/St.Anne Nackawic	473,000	B.C. Forest Products	403,000
Sub-total	1,243,000		1,841,000		2,482,000		3,027,000
Others	1,189,000		2,353,000		5,820,000		5,593,000
Total	2,432,000		4,194,000		8,302,000		8,620,000
Share of top five companies in total shipments	51%		44%		30%		35%

1 Canadian International Paper, Great Lakes Forest Products.
2 MacMillan Bloedel, MacLaren.
3 MacMillan Bloedel, MacLaren, Northwoods, Fraser.

Source Peter M. Thain, The Political Economy of the Pulp and Paper Modernization Program, unpublished M.B.A. dissertation, University of British Columbia, April 19, 1984, p. 3-7.

Table 2-18

Concentration in Other Paper and Paperboard, Canada, 1954-74
(Top 5 producers as % of total shipment)

	1954	1964	1974
Paperboard	61	67	60
Printing and writing paper	80	80	79
Wrapping paper	80	77	73

Source Peter M. Thain, The Political Economy of the Pulp and Paper Modernization Program, unpublished M.B.A. dissertation, University of British Columbia, April 19, 1984, p. 3-7.

Table 2-19

Changes in the Distribution of Plant Size, Canadian Pulp and Paper Mills, 1963-83

Average number employed	1963		1983	
	Number of establishments	Per cent	Number of establishments	Per cent
Less than 49	8	6.3	6	4.3
50 - 99	12	9.5	10	7.3
100 - 199	20	15.9	12	8.8
200 - 499	37	29.4	49	35.8
500 and more	49	38.9	60	43.8
Total	126	100.0	137	100.0

Source Statistics Canada, Pulp and Paper Mills, (Ottawa: Supply and Services Canada), 36-204, annual, 1963 and 1983.

Table 2-20

Vertical Integration in the Canadian Pulp and Paper Industry, early 1980s

	Timber			Building materials					Mechanical				Chemical				Fine Paper		
Firm	Forests	Logging	Trans-port	Lumber	Ply-wood	Whole-sale	Retail	Con-struction	Pulp	News-print	Trans-port	News-paper	Pulp	Kraft paper	Liner-Board	Containers	Fine paper	Con-verters	Print
MacMillan Bloedel	X	X	X	X	X	X			X	X	X		X	X	X	X	X		
Domtar	X	X	X	X		X			X	X	X		X	X	X	X	X	X	
Abitibi-Price	X	X	X	X		X			X	X	X		X	X			X	X	
Con. Bathurst	X	X	X	X		X			X	X	X		X	X					
C.I.P.	X	X	X	X		X			X	X	X		X						
B.C. Forest Prod.	X	X	X	X	X	X			X	X	X		X						
Canfor	X	X	X	X	X	X							X	X					
C. Zellerbach	X	X	X	X	X	X	X		X	X	X		X	X					
Great Lakes	X	X	X	X		X			X	X	X		X				X		
Kim Clark	X	X	X	X									X						
Weldwood	X	X	X	X	X	X							X						
Eddy	X	X	X	X		X							X	X			X		
Cancel	X	X	X	X	X	X							X						
Northwood	X	X	X	X	X	X							X						
Ontario Paper	X	X	X	X		X			X	X	X								
Fraser	X	X	X	X									X	X			X		
Reed	X	X	X	X		X			X	X	X		X	X	X	X	X		
Donohue	X	X	X	X		X			X	X	X		X						
Kruger	X	X	X						X	X	X		X	X	X	X			
Bowater	X	X	X	X		X							X						
Ray	X	X	X	X		X							X						
Boise Cascade	X	X	X	X		X			X	X	X		X						
Whonnock	X	X	X	X		X													
Rolland																	X		
Spruce F.	X	X	X	X		X			X	X	X		X						
Tahsis	X	X	X	X		X							X						
W. Fraser	X	X	X	X		X	X												

X Indicates the activity the firm is engaged in.

Source S. Globerman and R. Schwindt, "The Organization of Vertically Related Transactions in the Canadian Forest Products Industries," Journal of Economic Behaviour and Organization, 7, 1986, p. 205.

Table 2-21

Price Leaders - North American Newsprint Industry,* 1950-72

Year		Price leader	Initial price ($U.S.)	Other announced prices ($U.S.)	Final price ($U.S.)	Firm whose price prevailed
1950		Powell**	110	106; 105	106	International
1951		Abitibi	116	115; 114	116	Abitibi
1952		Abitibi	126	123; 122	All five	-
		Consolidated		121; 125.50	prices	
1953		Dispersion of prices reduced to	123-126			-
1955		St. Lawrence	131	130; 129	All three prices	-
1956	Jan. 1	Order restored	-	-	130	International
1957		Abitibi	134	134.50	134	Abitibi
1964		MacMillan-Bloedel	124 +	134 in East		MacMillan-Bloedel
1966		Crown Zellerbach	134 +	145; 141	139	Great Northern
		Bowater	144	139		Kimberly-Clark
		Crown Zellerbach	138 +	137 +	137 +	MacMillan-Bloedel
1967		Consolidated	142	-	142	Consolidated
1969		International	147	146	Both prices	International; Southland***
		Bowater	152	151	Both prices	Bowater; Southland
1970		Anglo-Canadian	162	160; 158	All prices	Anglo; Boise, Southland
1971		International	165	-	165	International
1972		Kimberly-Clark	163 ++	-	163	Kimberly-Clark
		Great Northern	170	-	170	Great Northern

* Initial price in 1950 = $100 (U.S.); price changes after 1972 became too complex for this table and are discussed in the appendix.

** Powell later merged with MacMillan-Bloedel.

*** With Southland's appearance as a price-setter the market was segmented into three regions, the South, the West Coast, and the Northeast-Midwest markets.

\+ West Coast price only.

++ Southern price only.

Source Gordon P. Schaefer, The Canadian Newsprint Industry: Econom[illegible]ic Models of Different Market Structures, Bank of Canada Technical Report No. 17, October 1979, p. 9.

Table 2-22

Survey of Evidence on the Determinants of Price Change in the Canadian Pulp and Paper Industry, 1933-1981

Author(s)	Industry	Period	Demand[1]	Tech change	Output	Strikes	Exchange rate	Cost variables
Dagenais (1976)	Newsprint	1933-71	N. American operating rate[3] ✓					Weighted average of input prices adjusted for exchange rate ✓
McFetridge I (1973)	Pulp & paper	1958-69	Demand disequil. variable ✓				U.S. price adj. for exch. rate ✓	Normal unit labour costs material prices
McFetridge II (1973)	Pulp & paper	1958-69	Demand disequil. variable ✓				U.S. price adj. for exch. rate ✓	Current unit labour costs ✓
Schefer[2] I (1979)	Newsprint	1947-76	N. American operating	Dummy variable ✓		Dummy variable ✓		
Schefer II (1979)	Newsprint	1947-76	N. American operating rate	Dummy variable ✓			Canadian dollar in U.S. currency ✓	Unit Costs ✓
Nautiyal and Singh (1984) I	Newsprint	1955-81	Capacity utilization	Dummy variable ✓	✓			Prices of materials✓, energy✓, labour✓, and capital
Nautiyal and Singh (1984) II	Other paper	1955-81	Capacity utilization	Dummy variable ✓				Prices of materials✓, energy✓, capital✓, and labour
Nautiyal and Singh (1984) III	Wood pulp[4]	1955-81	Capacity utilization	Dummy variable				
Nautiyal and Singh (1984) IV	Pulp & paper	1955-81	Capacity utilization	Dummy variable	✓			Prices of materials✓, energy✓, labour✓, and capital

1 For the definition of variables and their construction, see individual studies.
2 In addition to these variables, there was also a lagged price variable, which was found to be statistically significant.
3 Statistical significance denoted by ✓ (check mark).
4 For wood pulp, statistical significance of variables not given.

Sources M. G. Dagenais, "The determination of newsprint prices," Canadian Journal of Economics, August 1976, pp. 442-461. D. G. McFetridge, "Short-run price adjustment in the Canadian manufacturing sector," in Essays on Price Changes in Canada, Prices and Incomes Commission, 1973, pp. 93-156. G. Schaefer, "The Canadian newsprint industry," Bank of Canada Technical Report No. 17, October 1979. B. K. Singh and J. C. Nautiyal, "Factors affecting Canadian pulp and paper prices," Canadian Journal of Forestry Research, No. 5, October 1984, pp. 683-691.

Table 2-23

Trends in Productivity: Canadian Manufacturing Industries, 1958-82

Industry	Total factor productivity growth			Labour productivity growth		
	1958-1966	1967-1973	1974-1982	1958-1966	1967-1973	1974-1982
Durables	1.16	1.35	-0.14	3.97	5.29	0.99
Wood	0.67	0.54	0.64	2.42	2.94	2.23
Furniture and fixtures	1.13	0.62	-0.06	2.77	3.05	1.06
Iron and steel	1.52	1.18	-0.89	4.60	3.71	-0.94
Nonferrous metals	1.34	0.47	-0.17	4.74	3.24	0.09
Metal fabricating	1.09	0.92	-0.07	3.02	2.60	0.77
Machinery	1.37	1.66	0.70	4.65	4.93	4.28
Nonauto transportation equip.	0.33	0.30	-0.37	3.67	2.50	-0.37
Motor vehicles	0.92	2.81	-0.01	4.24	10.16	2.39
Motor vehicle parts and acc.	0.99	2.73	-1.31	4.31	7.40	-0.51
Electrical products	2.19	1.14	0.10	5.32	4.33	0.53
Nonmetallic minerals	0.77	1.57	0.68	1.87	4.26	0.20
Non Durables	0.75	0.85	-0.22	3.27	4.13	1.06
Food and beverages	0.36	0.42	-0.08	2.43	3.06	1.45
Tobacco	0.78	0.68	-0.07	4.91	3.12	2.08
Rubber and plastic products	2.75	1.31	0.06	7.72	6.70	1.54
Leather	0.65	0.77	0.57	1.66	2.72	2.63
Textiles	1.79	2.38	0.49	6.00	7.51	1.78
Knitting and clothing	0.97	0.87	0.40	3.00	4.00	1.64
Paper and allied products	0.81	1.13	-0.32	3.41	3.92	0.07
Printing and publishing	0.34	1.49	0.40	1.59	3.32	1.00
Petroleum products	0.64	0.30	-0.79	6.05	6.66	-5.66
Chemicals	1.42	1.47	-0.87	5.18	6.00	-0.16
Misc. manufacturing products	-0.01	0.32	0.08	0.92	3.39	1.00

Source P. S. Rao and R. S. Preston, "Inter-factor Substitution and Technical Change: Evidence from Canadian Industries," Economic Council of Canada, Discussion Paper 242, 1984, updated by the authors.

Table 2-24

Annual Rates of Growth of Real Output,* Employment and Labour Productivity in the Pulp and Paper Industry, Provinces, 1967-83

	Quebec			Ontario			British Columbia			Maritimes & Prairies		
	$\dot{Q}$	$\dot{E}$	Prod	$\dot{Q}$	$\dot{E}$	Prod	$\dot{Q}$	$\dot{E}$	Prod	$\dot{Q}$	$\dot{E}$	Prod
	(Per cent)											
1967-73	1.68	-0.04	1.72	2.70	-0.33	3.03	7.53	5.27	2.26	7.68	2.65	5.03
1974-79	3.76	2.20	1.56	3.38	1.01	2.37	2.38	1.17	1.21	1.29	0.98	0.31
1980-83	2.36	-1.26	3.62	2.69	-2.06	4.75	0.01	-3.91	3.92	-0.93	-2.96	2.03
1970-79	2.28	1.15	1.13	2.71	0.47	2.24	3.58	3.25	0.33	4.15	1.97	2.18
1970-83	2.30	0.73	1.57	2.71	-0.25	2.96	2.56	1.20	1.36	2.70	0.56	2.14

* Value of shipments deflated by GDP price deflator for paper and allied products. The data on the implicit price deflator was taken from the CANDIDE Databank.

$\dot{Q}$ = real output growth; $\dot{E}$ = employment growth; Prod = growth in output per employee. Data on shipments and employment from CPPA, Reference Tables, 1975, p. 52 and 1985, p. 54.

Table 2-25

Productivity Growth in the U.S. Pulp and Paper Industry, 1961-84

	Annual rate of growth (per cent)
	Output per person hour
1962-66	4.98
1967-73	4.22
1974-80	2.10
1981-84	3.00
1974-84	2.43

Source American Paper Institute: Statistics of Paper, Paperboard and Wood Pulp, Data Through 1984 (New York: American Paper Institute), Table XXIV, p. 56.

Table 2-26

Productivity Growth in Paper and Allied Industries, Canada, 1958-80

Contribution	1958-66	1967-73	1974-80
$(\dot{K}/L)$	0.40	0.37	-0.04
$(\dot{E}/L)$	0.17	0.25	-0.16
$(\dot{M}/L)$	1.98	2.13	-0.02
$\dot{TFP}$	0.73	1.10	0.74
$\dot{Q}/L$	3.28	3.85	0.52

K, L, M, and E represent capital, labour, energy and materials respectively. Q and TFP represent output and total factor productivity.

Source P. S. Rao and R. S. Preston, Interfactor Substitution, Economies of Scale and Technical Change: Evidence from Canadian Industries, Economic Council of Canada Discussion Paper 262, 1984.

Table 2-27

Comparison of Actual and Long-Run Paths of Total Factor Cost, 1956-82, Canadian Pulp and Paper Industry

	Actual total cost (1)	Optimal total cost (2)	Percentage deviation of (1) from (2)
		(Millions of dollars)	
1956	1,108.17	969.37	14.32
1958	1,241.51	1,082.56	14.68
1960	1,385.89	1,201.56	15.34
1962	1,441.75	1,290.20	11.32
1964	1,643.29	1,562.59	5.18
1966	2,005.16	1,886.59	6.34
1968	2,205.47	2,069.82	7.19
1970	2,484.83	2,380.39	4.38
1972	3,016.40	2,686.66	12.27
1974	4,408.51	3,586.51	23.14
1976	5,648.71	4,569.55	23.62
1978	6,815.81	5,591.82	26.41
1980	9,033.03	7,256.55	24.48
1982	10,009.37	8,069.25	24.04

Source J.C. Nautiyal and B.K. Singh, "Long-Term Productivity and Factor Demand in the Canadian Pulp and Paper Industry," Canadian Journal of Agricultural Economics, March 1986, p. 36.

Table 2-28

Rate of Growth of Productivity and Production Costs on the Actual and the Long-Run Least-Cost Expansion Paths, Canadian Pulp and Paper Industry, 1956-82

Inputs	1956-62	1963-70	1971-82	1956-82
Materials				
Actual	-0.0131	-0.0139	-0.0032	-0.0064
Long-run	-0.0283	-0.0099	-0.0028	-0.0134
Labour				
Actual	0.0175	0.0219	0.0090	0.0184
Long-run	0.0075	0.0211	0.0248	0.0291
Capital				
Actual	0.0081	0.0108	0.0083	0.0089
Long-run	0.0184	0.0098	0.0285	0.0298
Energy				
Actual	0.0133	-0.0047	-0.0397	-0.0143
Long-run	0.0313	-0.0020	0.0281	0.0198
Average cost				
Actual	0.0178	0.0072	0.0173	0.0130
Long-run	0.0130	0.0074	-0.0075	-0.0033

Source Same as that of Table 2-27.

Table 2-29

Age of Newsprint Mills, Canada, United States and Scandinavia

Date machine installed or rebuilt	Percentage of machines		
	Canada	United States	Scandinavia
Pre-1950	58	28	7
1950-70	19	45	50
1970-84	23	27	43

Source Department of Regional Industrial Expansion, The Canadian Forest Products Industries: An assessment of the Pulp and Paper Industry, (Ottawa: DRIE), March 12, 1984, p. 14.

Table 2-30

Distribution of Newsprint Machine Capacity, Canada and Other Countries, early 1980s

	Total newsprint capacity ('000 tonnes/year)	Machine capacity ('000 tonnes per year)		
		100	100 to 150	150+
		(Per cent of machines)		
Canada	10,100	50	35	15
U.S.A.	5,300	15	55	30
Sweden	1,775	Nil	20	80
Finland	1,840	30	30	40
Norway	950	40	40	20
Scandinavia	4,565	20	30	50

Source Department of Regional Industrial Expansion, The Canadian Forest Products Industries: An assessment of the Pulp and Paper Industry, (Ottawa: DRIE), March 12, 1984, p. 15.

Table 2-31

Reduction in Pollution in the Canadian Pulp and Paper Industry, 1969-82

	Total Suspended Solids (TSS)		Biochemical Oxygen Demand (BOD)	
	Kg/tonne of Production		Kg/tonne of Production	
	1969-78	1978-82	1969-78	1978-82
	(% reduction)			
Atlantic	49	14	57	21
Quebec	55	13	20	16
Ontario	60	47	31	35
Northwest	54	15	23	45
Pacific	56	42	65	13
Canada	55	9	37	18

Source Environment Canada, Status Report on Abatement of Water Pollution from the Canadian Pulp and Paper Industry, July 1982, Table 2, p. 12 and October 1984, Table 4, p. 14 (Ottawa: Environment Canada).

Table 2-32

Person-Days Lost Due to Strikes, Forest Products Industry and Total Manufacturing, Canada, 1960-84

	Annual averages		
	Forest products (1)	Total manufacturing (2)	(1) and a % of (2)
1960-64	85,424	656,724	13.0
1965-69	317,306	2,374,262	13.4
1970-74	607,020	3,074,766	19.7
1975-79	1,138,686	3,431,202	33.2
1980-84	925,636	2,641,520	35.0

Source Based on unpublished data from Labour Canada.

Table 2-33

Cost Competitiveness and Export Performance, Paper and Allied Products, Canada, 1960-84

		Paper and allied products				
Year	X	ULC	ULC*	W	W*	Balance
1960	1.29	0.55	0.56	2.41	2.73	1.29
1965	1.65	0.55	0.58	2.84	3.28	1.65
1970	2.13	0.69	0.70	4.02	4.42	2.13
1975	2.01	1.18	0.87	6.82	6.73	2.01
1980	2.87	1.74	1.26	11.25	10.66	2.87
1984	3.02	2.54	1.40	16.41	14.04	3.02

Where X = Exports in billions of 1971 $ (Can.).
ULC = Unit labour costs, Canada (Can. $).
ULC* = Unit labour costs, United States (U.S. $).
W = Average hourly earnings, Canada (Can. $).
W* = Average hourly earnings, United States (U.S. $).
BAL = Net trade balance in billions of 1971 $ (Can.).

Source Canadian data from CANDIDE Data Bank and U.S. data from Wharton Econometrics.

Table 2-34

Newsprint Costs, Canada, United States and Scandinavia, 1982-83

(U.S. $ Per Tonne of Newsprint)

	U.S.A. south east	U.S.A. north west	B.C. Coast	Quebec	Finland	Sweden
Wood	76	65	77	112	112	122
Labour	74	88	92	87	56	47
Energy	110	100	72	60	79	67
Chemicals	17	17	11	10	10	11
Other materials	46	43	60	44	45	40
Overhead	38	28	47	44	26	17
Depreciation and interest	54	62	50	36	42	36
Total mill cost	415	403	409	393	370	340
Distribution	23	48	53	61	56	50
Total delivery cost	438	451	462	454	426	390

Source Department of Regional Industrial Expansion, Forest Products Directorate, The Canadian Forest Products Industries: An Assessment of the Pulp and Paper Industry (Ottawa: DRIE, March 12, 1984), p. A2/8.

Table 2-35

Bleached Softwood Kraft Pulp Costs, 1982-83
(U.S. $ per tonne)

	U.S. south	U.S. north west	B.C. coast	B.C. interior	Ontario	Finland	Sweden
Wood	135	122	135	107	156	174	165
Labour	44	48	60	49	60	42	34
Energy	49	54	51	44	51	19	18
Chemicals	45	38	42	43	70	37	34
Other materials	43	41	45	39	30	28	30
Overhead	33	49	40	39	42	26	18
Depreciation and interest	60	65	63	69	59	54	46
Total mill cost	409	417	436	390	468	380	345
Distribution cost (U.S.)	50	43	43	73	42	-	-
Distribution cost (Europe)	56	57	55	-	47	34	26
Total delivered cost (U.S.)	459	460	479	463	510	-	-
Total delivered cost (Europe)	465	474	491	-	515	414	371

Source Same as Table 34, p. A/3.

Table 2-36

Growth of Real Net Capital Stock, Manufacturing and Paper and Allied Products, Canada, 1961-85

	Average annual rates (per cent)		
	Aggregate economy	Manufacturing	Paper and allied products
1961-66	5.17	4.38	5.49
1967-73	5.24	4.78	4.92
1974-82	4.68	3.81	2.30
1983-85	2.58	0.66	-0.07
1961-73	5.21	4.58	5.21
1974-85	3.88	2.63	1.80

Source Statistics Canada, Fixed Capital Flows and Stocks, Historical, 1936-83, (Ottawa: Supply and Services Canada) Catalogue No. 13-568, occasional, and Statistics Canada, Fixed Capital Flows and Stocks, 1986, (Ottawa: Supply and Services Canada), Catalogue No. 13-211, annual.

Table 2-37

Capacity Utilization Rates, Profits Rates and Real Interest Rates, Manufacturing and Paper and Allied Industries, Canada, 1961-85

	Annual averages (per cent)				
	Net profit after taxes/total assets[1]		Capacity utilization		Real interest rates[2]
	Manufacturing	Paper	Manufacturing	Paper and allied products	
1961-66	6.35	4.86	82.1	94.8	3.52
1967-73	4.79	2.55	86.1	88.0	3.75
1974-82	5.52	5.75	82.0	82.4	2.23
1983-85	5.24	1.58	77.4	79.9	6.07

1 In current dollars available from 1962.
2 Available only up to 1984.

Source Statistics Canada, Capacity Utilization Rates in Canadian Manufacturing, (Ottawa: Supply Services Canada), Catalogue No. 31-003, quarterly, first quarter 1986, pp. 43 and 45. Real interest rates were estimated by adjusting government of Canada Bond yields -- 10 years and over -- by the expected inflationary rate. Data on these two series were taken from the following sources: Long-term bond yields, Bank of Canada Review, various issues; Expected inflation rate, CANDIDE data bank. Profit data from corporations branch, Statistics Canada.

Table 2-38

Effective Marginal Tax Rates in Manufacturing Industries, Canada 1980s

	Corporate tax							
	Alone		+ Property tax		Personal tax		Total tax	
	Rate (1)	Rank (2)	Rate (3)	Rank (4)	Rate (5)	Rank (6)	Rate (7)	Rank (8)
Food and beverages	- 1.16	12	4.09	12	23.29	2	26.87	11
Tobacco products	5.54	3	9.30	7	25.65	3	32.93	6
Rubber and plastics	0.78	11	5.81	9	24.39	9	29.23	9
Leather products	3.01	7	10.70	3	26.62	4	35.25	3
Textiles	- 3.51	15	1.44	13	22.22	17	23.73	16
Knitting mills	4.51	5	22.28	1	24.12	7	42.62	1
Clothing	5.27	4	9.42	6	26.47	2	33.80	4
Wood	- 4.72	16	- 0.32	16	24.79	15	24.93	13
Furniture and fixtures	0.96	10	9.75	5	25.58	8	33.66	5
Paper and allied industries	-13.87	20	-10.32	20	21.97	20	14.17	20
Printing and publishing	- 8.00	19	- 4.08	19	22.48	19	19.62	19
Primary metals	1.31	8	4.50	11	22.48	11	26.23	12
Metal fabricating	1.24	9	5.76	10	23.63	10	28.42	10
Machinery	4.28	6	8.86	8	24.82	6	31.89	8
Transport equipment	- 2.70	13	0.97	14	22.72	16	23.77	15
Electrical products	5.75	2	10.65	4	24.13	5	32.65	7
Nonmetalic minerals	- 4.88	18	- 1.10	17	22.56	18	22.00	18
Petroleum and coal products	- 4.78	17	- 3.13	18	25.81	13	23.64	17
Chemicals and chemical products	- 2.90	14	0.46	15	23.46	14	24.11	14
Miscellaneous manufacturing	5.91	1	13.09	2	26.39	1	36.70	2
Manufacturing, overall	- 2.86		1.12		23.41		24.60	
Variance	27.96		35.50		1.63		27.68	
Coefficient of variation	- 1.85		5.33		0.05		0.4	

Note The authors assume domestic investors only, perfect certainty, current tax rules, the firm's ability to claim all relevant tax allowances, and an expected annual inflation rate of 4.4 per cent. The pre-tax real rate of return is assumed to be fixed at 10 per cent.

Source M. J. Daly et al., "A Comparison of Effective Marginal Tax Rates on Income from Capital in Canadian Manufacturing," Canadian Tax Journal, Vol. 33, No. 6, November/December 1985, p. 1175.

3 THE MODERNIZATION PROGRAM

In the preceding chapter, it was suggested that the justification for the modernization grants program or any other form of subsidization of the pulp and paper industry was rather weak. Hence this chapter starts out with a discussion of some of the background reports which influenced government thinking and then goes on to describe the main features of the modernization program.

BACKGROUND STUDIES AND CONSULTATION WITH INDUSTRY

Consultation between the two levels of government and the pulp and paper industry had existed long before the establishment of the modernization grants program. It is beyond the scope of the study to deal with the historical narrative.[1] Instead, we begin with a few influential studies which appeared during the late 1970s which paved the way for the modernization program. One of these was the Report of the Consultative Task Force on the Forest Products Industry (1978). Its members were drawn from industry, universities, unions and provincial governments. Several federal departments acted as observers[2] and an official from the federal Department of Industry, Trade and Commerce (ITC) served as the Secretary.

This Task Force Report mentioned four broad areas of concern: cost disadvantages to which most Canadian firms were subjected in relation to their U.S. competitors, the unfavourable investment climate and more specifically, the unattractiveness of Canada for major new forest industry investment, the difficulties of generating adequate capital, and forest resource problems.[3]

The essence of the argument advanced in the task force report can be stated in the following manner. International competitiveness of the Canadian pulp and paper industry has suffered during the 1970s because of low productivity and high wages in Canada relative to her major competitors, namely, the United States and the Scandinavian countries. To improve productivity, capital investment would have to be increased. But because of the low rates of return experienced in the pulp and paper industry during the 1970s, firms have been unwilling to increase investment. Hence, modernization as well as pollution abatement and energy conservation has been slow in this industry. To correct these problems, the task force report made a case for tax incentives. It also advocated assistance to the manufacturers of pulp and paper machinery and parts. The basis for the task force recommendation for tax incentives was a 1973 Price Waterhouse study on taxation practices relating to pulp and paper undertaken for the government. After a detailed analysis of the tax systems in Sweden, Finland, and the United States, the study concluded that the tax burden facing Canadian pulp and paper producers was heavier than elsewhere.[4] However, the authors were quick to point out some major limitations of the analysis

including data problems, the exclusive focus on taxation, and the neglect of other forms of assistance.[5]

The task force report did not undertake any research before making the above recommendations. Instead, it relied heavily on a sector profile of the forest products industry prepared by the Department of Industry, Trade and Commerce and which was included as an appendix to the task force report. This sector profile highlighted the lack of international competitiveness of the Canadian newsprint industry (with the aid of an international cost comparison for 1975-76) and the decline in the rate of return on capital for the period, 1970-77. The sector profile emphasized the importance of capital investment in stimulating productivity growth without actually measuring its impact on the latter variable over historical periods. However, the estimates cited in the previous chapter showed that capital did not play a significant role in the productivity slowdown which occurred during the 1974-80 period. Indeed, the evidence suggests that this is true not only for the pulp and paper industry but for other industries as well. Thus, any major impact of changes in capital on productivity growth must come from improvements in the quality of capital about which we know very little but which may be important. Regarding the other issue of the alleged declining rates of return on capital in this industry, the evidence cited in the previous chapter showed that profits in the paper and allied products industry had increased significantly during the 1976-79 period, mainly due to the depreciation of the Canadian dollar relative to the U.S. Furthermore, the evidence seems to suggest that the economic rates of return on capital investment in pulp and paper mills located in Ontario and Quebec were higher than those in Southern U.S. during the early 1980s. Thus it would seem that expected profitability was not so low as the task force report made it out to be.

The provincial governments also set up task forces to study the problems of the pulp and paper industry due to the pressure brought on them by the industry. They also discussed the same problems but from a provincial perspective. A case in point is the Ontario Task Force which was set up to devise a program of assistance to the province's pulp and paper industry and which submitted its report in 1978. The report commenced its discussion by pointing out the heavy dependence of certain communities on the industry and then went on to argue that "the vulnerable communities is sufficient reason in itself for assisting industry."[6] But it did not examine whether assistance to firms in the form of tax incentives (which was its specific recommendation) was the most efficient way of achieving the employment objective. The task force argued that due to low profitability, the industry was unable to undertake new investment. At the same time, however, it did mention the significant increase in profits between 1977 and 1978 which was attributed to the depreciation of the Canadian dollar relative to the U.S. dollar.[7] But the report was of the opinion that the exchange rate depreciation was a transitory phenomenon which could easily change its direction. A

staff study prepared by Ontario's Ministry of Treasury and Economics in June 1979 showed that during the 1969-78 period when profitability was believed to have been low, the province's pulp and paper industry had spent $1.6 billion (1978 dollars) on capital investment[8] which was slightly higher than the $1.2 billion (1978 dollars) forecasted by the task force as being the capital needs for the province's industry over the next five years. The staff study, however, pointed out that 51 per cent of the investment in Ontario's pulp and paper industry during 1969-78 was undertaken at three mills.[9] Furthermore, it argued that about three-quarters of the investment was in pulp.[10] The reason why only a few mills undertook new investment was probably because of their greater profitability relative to other mills and hence the staff study's recommendation for assistance is tantamount to subsidizing the relatively unprofitable (and probably the inefficient) operations of the industry. Neither the task force nor the staff study made any reference to energy conservation: their sole focus was on modernization and environmental protection. On the latter aspect, the task force pointed to the considerable progress made in the province's pulp and paper mills over the past 10 years, having spent about $200 million (current dollars).[11] This again begs the question regarding the need for assistance. The task force also advocated assistance to the pulp and paper parts and machinery industry on the grounds that with assistance, the industry was capable of producing the parts and equipment needed in the pulp and paper industry. But it did not address the issue of the extra cost involved in producing these items in Canada compared with importing them from abroad.

These task force studies were a preliminary response by the governments to repeated demands made by the pulp and paper industry for increased government assistance. The industry made it clear to the provincial governments that with present trends it would be more advantageous for the companies to close down many of their operations in Quebec and Ontario than to invest corporate capital in modernizing them. The provincial governments became extremely concerned because not only would such a move threaten the provincial economies, it would also jeopardize thousands of jobs as well as many communities where the pulp and paper industry constituted the economic backbone.

Faced with the threat of plant closures,[12] the provincial governments were interested in taking immediate action, but the options available to them were felt to be limited, without the financial backing of the federal government. One course of action which the Quebec Government used in some instances was equity ownership, the most notable being the takeover of Domtar in 1979-81. In addition, the Quebec Government also announced in June 1978 a major program under which Quebec would spend about $450 million (current dollars) over a five-year period aimed at stimulating private investment in the pulp and paper industry. The incentives offered by the Quebec government consisted of grants, subsidized borrowing and an investment fund derived from industry taxes that would be returned to producers with approved

projects. The Ontario Government also announced similar incentives in November 1978, following the publication of the Report of Ontario Special Task Force on Pulp and Paper.

In 1978, the province of Quebec approached the Federal Department of Regional Economic Expansion (DREE) with a request for support for a program to modernize their pulp and paper industry through a DREE subsidiary agreement. Initially, the Quebec proposal identified a joint federal-provincial program to offer incentive assistance in the form of grants up to 25 per cent of approved capital costs.[13] The federal response came early in 1979 when the cabinet adopted a national strategy for the development of the forest products industry.

The federal government also tried to justify the assistance to the industry by referring to the following "areas of difficulty"[14] experienced by the pulp and paper firms:

- The low rate of return on capital in pulp and paper compared with the rest of Canadian manufacturing and the U.S. pulp and paper industry;

- The cyclical nature of the problems facing the industry. The federal government stated that "the Canadian industry is characterized by a high degree of cyclical return on invested capital (due in large part to the role Canadian firms play as swing suppliers to foreign markets) i.e., supplying to meet cyclical excess demand."[15] However, it was nowhere mentioned why this should be treated as a major problem, because cyclical factors are essentially of a temporary nature and affect many industries, not just pulp and paper.

- The Canadian pulp and paper industry's share of several key export markets was being eroded by competition abroad;

- High inputs costs, low productivity, as well as lack of expenditures for necessary pollution abatement.

With regard to the erosion in international competitiveness, it was shown in Chapter 2 that it was caused by the escalation of wages and the low productivity growth in Canadian pulp and paper relative to her competitors, which in the case of Canadian exports of pulp and paper to the U.S., was partly offset by the depreciation of the Canadian dollar relative to the U.S. currency during the latter part of the 1970s. Since wages depend on productivity, the key variable on which attention should be focused is productivity, the slowdown of which was mainly caused by the energy price increase and the decline in demand. It is not clear whether the energy price shocks had a more severe impact on the Canadian pulp and paper industry than elsewhere and if so, why. Regarding demand, the evidence suggests that the deceleration was greater in Canada than in the U.S., which is our principal trading partner. Growth in pulp production in the U.S. fell from 11 per cent in 1970-74 to 4 per cent in 1974-78, whereas

in Canada it declined from 18 to 2 per cent during the same periods.[16] Similarly, whereas U.S. newsprint output growth increased from 3 to 6 per cent between 1970-74 and 1974-78, in Canada it declined from 17 to 2 per cent. This slowdown in demand may have set in motion a vicious circle. A decline in demand reduces productivity growth, which in turn leads to higher unit costs in Canada relative to her competitors. This contributes to a further decline in demand for Canadian pulp and paper, a further deterioration in productivity and so on. Modernization grants cannot help to break this vicious circle because it really cannot stimulate demand, the deceleration of which has been a global phenomenon. If the grants program increases investment, it will aggravate the situation by increasing excess capacity in the industry.

Thus the initiative to ameliorate their conditions must come from the firms themselves through better marketing strategies, improvements to the quality of products, moving into areas where demand is strong, and so on. The government can help indirectly by encouraging firms to adjust to the new trading environment. This could be done by facilitating the mobility of capital through the removal of legal impediments (eg. anti-trust laws toward firm mergers, provincial securities laws that impose costly conditions on takeover bids, tax reform, etc.) and by encouraging the mobility of labour (eg. by providing information regarding jobs, mobility grants, portable pensions, etc.) and retraining of workers.

The two levels of government, however, did not reason along the above lines. Instead, they hastened with a policy of modernization grants. With regard to the choice of policy instrument, despite the recommendations of the task forces mentioned earlier concerning tax incentives, the federal government opted for modernization grants. One reason for this is that, as pointed out in the Government's Response to the Recommendations of the Consultative Task Force (February 1979), the federal government had already instituted certain tax incentive provisions (e.g., extension and enrichment of the tax credit for investment and R & D and extension of the two year write-off for pollution control and equipment).[17]

A second reason for favouring grants over tax incentives is that the government felt that tax incentives benefitted the large and profitable firms but were not very effective in stimulating investment by smaller or less profitable firms. A third reason was that the government felt that grants enabled it to have some control in the firm's investment decision. As the Minister of DREE commented:

> We chose the grant route in addition to the tax credit route -- a double-barreled approach -- in order to benefit all the pulp and paper companies. Tax credits alone would have helped only those already in a strong profit position. And, of course, the grant route does

enable the government to retain a degree of discretionary control.[18]

On February 1, 1979, Mr. Robert Andras, the President of the Board of Economic Development ministers, presented the pulp and paper modernization grants program as a national development policy for assistance to the forest products industry. The pulp and paper modernization grants program as announced provided for federal contributions of $235 million (current dollars)[19] toward federal/provincial cost-shared agreements.

On May 15, 1979, subsidiary development agreements between DREE and the provinces of Ontario and Quebec were signed. The Minister of Regional Economic Expansion also indicated that similar federal programming might be extended to other provinces where such development opportunities were thought to exist.

On July 31, 1980, the Minister for Regional Economic Expansion announced "An Improved Forest Industry Assistance Program" which increased the funding to $276 million (current dollars) and redirected the program to projects in Newfoundland, Nova Scotia, New Brunswick, Quebec and Ontario.[20] The increase in the amount of funding was due to increased demands for grants by industry which led the provincial governments of Quebec and Ontario to increase their own contributions and ask for additional federal funds.

The Minister for Regional Economic Expansion also announced in July 1980 a commitment to work with the forest industry and the governments of British Columbia, Alberta, Saskatchewan and Manitoba towards the development of programs tailored to the forestry needs of those provinces. The rationale for redirecting the program to projects in the east was that "compared to eastern mills, pulp and paper mills in the west are relatively modern and have turned in stronger performances in the world market. As a result, assistance provided under the terms of the modernization program is less appropriate there."[21]

Under the improved forest industry assistance program as announced in July 1980, subsequent subsidiary development agreements were negotiated with the provinces in the Atlantic Region. The implementation of the program to modernize the pulp and paper industry did not preclude the possibility that federal financial support could be provided to projects outside the framework of the program but within separate subsidiary development agreements for special cases.

The total amounts spent and the federal/provincial cost ratios are shown in Table 3-1. British Columbia did not participate in the program. The program's feature which bothered the British Columbia government most was that federal grants to that province had to be matched by the provincial government on a dollar for dollar basis. Given the industry's performance in British

Columbia, both the provincial government and the provincial opposition felt that there was no need for government assistance.

Although British Columbia did not participate in PPMP, this does not mean that the two levels of government did not assist the pulp and paper producers in that province. On the contrary, the evidence shows that the federal and provincial governments provided considerable assistance to the British Columbia pulp and paper producers. For example, under the terms of the Canada-British Columbia Subsidiary Agreement on Intensive Forest Management (1979-84), the two governments agreed to contribute $25 million (current dollars) each for such purposes as reforestation, fertilization, restocking lands which had been previously logged or damaged by fire, and intensive forest management projects. Since British Columbia accounts for almost half of Canada's timber, the agreement was of considerable benefit to the province's forest products industry.[22] Similarly, it has been pointed out that British Columbia was one of the main beneficiaries of the Forest Industry Renewable Energy (FIRE) Program which was a cost-sharing arrangement between the federal and provincial government and administered by the federal Department of Energy, Mines and Resources. Its objective was the development of alternate sources of energy such as the use of proven technology to convert forest or mill residues to energy.[23]

OBJECTIVES

The subsidiary agreements signed between the federal and provincial governments were quite explicit about the reasons for signing these agreements and the objectives of the program. For example, the Canada-Quebec Agreement started with the following preamble:

> ...whereas the pulp and paper industry is one of the economic and industrial mainstays of Quebec, by virtue of both the volume of its exports and its production and employment levels;
> and whereas there is a need to make the industry more competitive through modernization and reduced operating costs, thus making it possible to consolidate existing jobs and to continue promoting the creation of new employment in this key sector of the Quebec economy;
> and whereas it is necessary to encourage the protection of the environment and the conservation of energy.[24]

The objectives of the program were also made explicit in the following manner:

> 3 ...the purpose of this agreement is, more specifically, to offer financial assistance to pulp and paper companies eligible for the program, to enable them to:

a) modernize their facilities with a view to reducing production costs;

b) install equipment that will help the environment and conserve energy.[25]

In the next chapter we examine the way in which these objectives were implemented.

THE SHARING OF COSTS

PPMP was essentially a cost-sharing agreement between the federal and provincial governments. As shown in Table 3-1, the federal and provincial cost-ratios vary from region to region but no explanation was given for this, except for the following statement from the president of the Board of Economic Development Minister:

> On the geographical distribution of benefits, I want to emphasize that there is no allocation per se of dollars to any one region. Estimates of the probable cost of the program in the various provinces were made but mainly for budgetary purposes. The actual allocations in the various regions will be dependent on the number of firms that apply and will tend to reflect the distribution and age of the pulp and paper industry across Canada.[26]

Mills in Quebec received the largest absolute dollar amount of the grants, followed by Ontario and the Atlantic Region, in that order. However, when the grants were expressed as a ratio of the regional pulp and paper production, Ontario's share turned out to be the largest, followed by Quebec. At a first glance, the inclusion of Quebec and Ontario in the program is somewhat surprising because, as pointed out in Chapter 2, those were the only two regions where the pulp and paper industry had experienced a faster rate of growth in real output during the 1974-79 period compared with the 1967-73 period. Furthermore, the productivity slowdown in pulp and paper was also much smaller in these two regions during the 1974-79 period than in the other regions (Table 2-31). However, it is difficult to determine whether the above conclusions apply to all or only some segments of the industry without a more disaggregate analysis on a regional basis. Unfortunately, data limitations preclude such an analysis. But if changes in regional capacity[27] are any indication of changes in productivity and competitiveness, then it would seem that it is newsprint and not pulp which really experienced a deterioration during the 1970s. During the 1969-79 period Ontario experienced the largest contraction in newsprint capacity (-8 per cent), followed by British Columbia (-5 per cent), while Quebec and the Atlantic provinces experienced capacity increases of 4 and 2 per cent respectively. Regarding pulp capacity, all producing regions experienced increases, with Ontario leading the list (80 per cent) and Quebec next with 46 per cent during 1970-80. Thus one might

conjecture that the weak performance of the Ontario newsprint industry may have been an important consideration influencing the government's decision to extend such a large amount of assistance to that province; but the same argument cannot be used to explain subsidies to Quebec mills since Quebec fared reasonably well in terms of both pulp and newsprint capacity. In any event, the original intention of the federal and well as of certain provincial governments such as Quebec was not to provide assistance for newsprint speedups. On this, the then Minister of Regional Economic Expansion, Mr. Pierre de Bané stated that:[28]

> Assistance to conversion or greenfield projects could be considered in special circumstances on a case-by-case basis. Such consideration permits a measure of influence in ensuring that uncontrolled expansion does not lead to overcapacity in the industry, which, together with considerations of high profitability, were the reasons why no assistance to newsprint machinery speed-ups was originally considered.

If newsprint was highly profitable, then it could not have suffered from a lack of international competitiveness, as the capacity data seems to suggest. In any case, the important point is that funds were given to newsprint mills even though the original intention was to exclude newsprint from the PPMP.

ADMINISTRATION AND MANAGEMENT

A federal-provincial Management Committee administered the agreement and had equal representation from the federal and provincial governments. Appointments to the Management Committee were the responsibility of the federal Minister of Regional Economic Expansion and the provincial Minister of Development.

The responsibilities of the management committee included assessing the projects and recommending to the ministers the appropriate courses of action to be taken in such matters as the amount and terms of the grants, notifying the applicant of the decision taken by the ministers, and submitting each year a progress report on the program for approval of the ministers.[29] The committee was also responsible for the preparation of guidelines for eligibility, assessment, funding and implementation procedures, subject to the approval of the ministers.

CRITERIA FOR APPLICANTS

To be eligible for assistance under the agreement, the applicant's proposed project had to meet the following criteria:[30]

1 the project was not likely to occur without government assistance;

2 only expenditures made after submission of an application were eligible for assistance;

3 projects were to be commercially viable over the long-term and not require further government assistance;

4 projects were in accordance with existing statutes regarding pollution control and resource management.

There were two other criteria for eligibility which should be mentioned. For instance, the Canada-Quebec agreement stated that:

16(c) A socio-economic cost-benefit analysis must show that the project will result in a net profit.[31]

The Canada-Ontario agreement mentioned that:

6(d) The applicant's proposed project makes a significantly improved contribution to the economic well-being of the local community, Ontario and Canada.[32]

Criterion 1 is extremely important and is referred to as incrementality. This aspect of project along with socio-economic cost-benefit analysis which is another aspect important evaluation will be discussed in the next chapter. Criterion 2 is a necessary condition for incrementality. That is, to be considered incremental, the project should not have been planned before the subsidy program came into existence. Hence criteria 1 and 2 are consistent. But there is no consistency between criteria 1 and 3: projects which are commercially viable are not incremental and should not qualify for assistance. Such projects would have been undertaken regardless of the subsidy. The importance of a specific project to the local community, province and the aggregate economy implicitly deals with the maintenance of stable employment, which of course depends on whether the mill is internationally competitive or not.

Assistance available from other government programs, both federal and provincial, was considered when making the decision as to the size of the incentive grant. If a project was eligible for other assistance it could not be considered under this Agreement. For example, the Agreement was coordinated with the federal Forest Industry Renewable Energy (FIRE) program. The Agreement considered eligible those measures taken to significantly increase the energy efficiency or reduce the overall energy requirements of a facility, exclusive of those measures eligible for assistance under FIRE.

ELIGIBLE COSTS

The Agreement contributed to the approved capital costs associated with the following types of changes to primary pulp and paper product manufacturing and processing facilities:[33]

a) pollution abatement;
b) modernization of production processes;
c) rationalization of production;
d) increases in value added of production; and
e) efficient utilization of energy resources.[34]

The most important of the eligible costs was the expenditure on modernization of the production process, accounting for about 70 per cent of total investment expenditure under the program. Next in importance was pollution abatement which accounted for another 10 to 15 per cent of total investment. The remainder was accounted for by energy conservation.

LIMITATIONS FOR APPLICANTS

Under the Agreement no incentive grants could be provided for the following:[35]

a) direct expansion of net newsprint production capacity;
b) forest access, harvesting, or management;
c) transportation system improvements;
d) manufacturing and processing of lumber or other solid wood products;
e) converting of paper or paperboard into intermediate or final goods;
f) normal preventive replacement, repair or maintenance that does not improve mill productivity significantly;
g) acquisition of land, acquisition of interests in land or cost arising from conditions such of an acquisition; or
h) modernization of assets for which an incentive has previously been authorized under the Agreement.

INVESTMENT PLANS

Five-year plans of corporate investment had to be submitted by the applicants and formed the basis for reviewing their investment proposals. Sometimes the firms asked for changes in investment levels from those presented in the original plans or suggested changes to the allocation of funds among projects within the same mill. For example, the total program funding levels in the Ontario and Quebec portions of the program were increased to $180 million and $240 million (current dollars) respectively to accommodate proposals from the companies for additional and/or larger projects.

Sometimes a firm could ask for a postponement or deferral in investment plans. According to a DRIE study, such deferrals or postponements have not been a major issue in any province except Quebec.[36] As of March 31, 1983, Quebec companies had expended only 34 per cent of total planned investment as a result of deferrals or postponements, although no explanation was given as to why only Quebec was affected by this problem.

LEVEL OF ASSISTANCE

For Ontario, Quebec and Nova Scotia, the program stipulated that up to 25 per cent of eligible costs were available as an incentive while for New Brunswick up to 20 per cent of eligible costs were available.[37] These amounts reflected the initial requirements for project level assistance anticipated by the governments in the respective regions. In the case of New Brunswick and Ontario, the level of assistance awarded to different projects was determined after negotiation with each company. However, this was not the case in Quebec where a fixed level of assistance was awarded to all projects deemed eligible. It is not known why the practice in Quebec was different from that followed elsewhere.

DISBURSEMENT OF FUNDS

In Ontario, for example, the provincial share of the grants was paid "up front" while the DREE allocation was paid over the period of each mill's modernization. But even in Ontario, there were a few exceptions, where the entire federal/provincial grant was paid up-front.[38]

CANADIAN CONTENT

The requirements for Canadian content in the purchase of machinery and equipment were defined in each subsidiary agreement, specifically section 11(1) for Ontario, 28 for Quebec, and 2.9(a) for New Brunswick. For example, the Quebec agreement stated that:

> Canadian material as well as Canadian professional services shall be used in respect of all project to the extent to which such material and services are available and consistent with proper economy and without prejudice to the expeditious completion of the program or projects.[39]

Some of the other subsidiary agreements such as those signed with Ontario and New Brunswick refer, in addition, to "machinery and equipment."[40]

Once the company's investment plan had been examined and the projects selected for assistance, a contract or letter of offer was signed with the company. This contract specified in detail the terms of the assistance and the requirements on the part of the company. This included, for Ontario and New Brunswick, a specific level of Canadian content based on the detailed analysis of the plan and discussions with the company. The Quebec contracts did not specify the level of Canadian content to be achieved by the company. However, the letter of offer to the company contained a strongly-worded paragraph referring to the importance attached by both governments to the maximization of Canadian content and the possibility of assistance being withheld if the level was not deemed adequate.[41]

The monitoring of Canadian content levels depended to a large extent on the cooperation of the pulp and paper companies with the governments. The subsidiary agreements and the contracts/letters of offer with the companies specified that the parties would make available to each other, information that was required for program monitoring and management. Sources of such information included company investment plans, contracts with the companies, thirty-day notices (of a company's intention to a contract offshore valued at more than $250,000), quarterly or semi-annual reports submitted by the companies in some provinces, company claims for progress payments, etc.[42]

As program administration was handled by the provincial governments for each subsidiary agreement, primary responsibility for monitoring Canadian content levels rested with provincial officials. They in turn were to provide the information to the federal government.

PUBLIC REACTION

The Modernization Program elicited response from a number of sources from the very beginning. Criticism of the program focused on a number of issues. They include the need for assistance, excessive reliance on bureaucratic discretion, the danger that the program would lead to excess capacity, penalization of winners and rewarding of losers, etc. Some have even questioned the legal basis for giving out grants in this manner.

The Law Reform Commission (1986) commented on the difficulties in assessing the need for assistance. It felt that there was a great deal of vagueness in the criteria for selecting projects for assistance. As a result of this vagueness, the Law Reform Commission argued that the management committee which was responsible for selecting applicants had wide discretion for the interpretation of the provisions of the agreement. The Commission also pointed out that rejected candidates had no clear legal recourse, because the management committee did not have to give reasons for their decisions and because of the vagueness of the eligibility criteria, the management committee could accept and reject proposals in an arbitrary fashion.[43]

The Law Reform Commission made another important comment regarding the vagueness governing federal authority for the pulp and paper modernization program. According to it, "the only federal statutory authority for the PPMGP (Pulp and Paper Modernization Grants Program) is found in one long ambiguous sentence buried in Vote 11a of the Schedule to the Appropriation Act No. 5, 1973. Appropriation Acts are presented to Parliament at regular intervals, they are under an automatic debating time-limit, and are usually so detailed and lengthy that they normally escape the normal close scrutiny given to other legislation ... In short, the statutorily proclaimed objective is extremely vague and it thus provides a wide mandate for the

program, but little direction as to what is and is not eligible under the program."[44]

Some[45] thought that the modernization program would aggravate the excess capacity conditions already prevalent in the pulp and paper industry during the seventies (see Table 2-37). This problem would not arise if, as federal officials thought to be the case, all of the grants were channelled into modernization, pollution abatement and energy conservation. But there were problems of interpretation regarding the division between increased production and modernization.

The former Chairman of the Consultative Task Force on Forest Products commented that:

> "A question will also arise whenever, as often happens, you replace an obsolete piece of equipment with a modern one of larger capacity. Will such an expenditure be ineligible for a grant?"[46]

The DREE Minister responded that:

> "The Department has only just so much money to help the industry and it is the modernization and environmental projects with which the industry says it needs the most help. But if a modernization project coincidentally includes an increase in capacity, this would not put it out of consideration."[47]

Because of the foregoing consideration, an element of flexibility had to be introduced into the program. The Ontario government, for example, did not wish to see any company plans for rationalization founder on the above distinction between modernization and capacity. Accordingly, it was decided as a criterion for obtaining a grant that company modernization plans should generally not involve an increase in capacity, although increases of 5 to 10 per cent would be acceptable, depending on the particular plan. This kind of problem highlights another major aspect of the program -- considerable reliance on bureaucratic discretion with regard to the funding of projects. It was left to the program administrators to determine which projects were to be funded and by how much.

Another major criticism of the program is that it penalized the firms which had already undertaken improvements at their own expense without waiting for government assistance. This problem was recognized by many, including Mr. Andras, the Minister of the Board of Economic Development Ministers who had originally announced the program.

Labour was also not in favour of the program. Representatives of unions indicated that there were inadequate measures for labour adjustment under the program and were also critical of the potential unemployment arising from the program.

There was also criticism of the payment procedures employed under the modernization program. For example, the Auditor General's report for the year ending March 31, 1985, stated that the agreement signed with the companies mentioned that if recipients did not expend the amount called for in the program, funds could be recovered from them. But there was a departure from this practice in four projects examined by the Auditor General where the agreement with the company stipulated that DRIE was to pay the full amount of its assistance before the company had spent the amount required on its modernization program under the agreement.[48] The Auditor General's report also noted that payments were based on expenditures in current dollars, but these expenditures were not adjusted back to 1978 dollars prior to payment to DRIE. As a result, recipients could, and in two cases did, receive full payment without spending the full amount called for in the modernization program as expressed in 1978 dollars.

ONTARIO

The Ontario-Canada Pulp and Paper Subsidiary Agreement was signed on May 15, 1979 with a termination date of March 31, 1984. An extension up to March 31, 1986 was allowed to process claims. Ontario's interest in the modernization grants program was to preserve the pulp and paper industry in the province. As the Globe and Mail's editorial "Pulp on the Payroll" (April 22, 1980) put it:

> "Why should Ontario be in danger of losing large parts of the industry? Because there could be more economic sense in building new plants in the southern United States or in developing countries ... Ontario has two advantages. It has a skilled work force, and it is close to the big markets of New York and Chicago. But the Ontario industry is antiquated. Much of its plant must be rebuilt or replaced if it is to be competitive..."

Before the agreement was signed, several important differences between Ontario and the federal government had to be resolved. One was the distinction between capacity improvements and modernization which was mentioned earlier. It was settled by introducing an element of flexibility into the agreement regarding capacity increases. Secondly, the province of Ontario wanted to be the dominant partner in the agreement which it was able to achieve by shouldering two-thirds of the cost of the program. No explanation was given as to why it wished to assume a dominant role. Differences also arose regarding the timing of payments, with Ontario favouring up-front money and the federal government leaning towards progress payments. The solution reached involved the provincial government making up-front money, with the DREE making progress payments spread over three years instead of the customary five.

Given the important role played by the Ontario government, its Ministry of Industry and Tourism became the leading agency. Also providing assistance were the Ministries of Intergovernmental Affairs, Natural Resources, Environment, Northern Affairs, Treasury, and the DREE.

Initially, $150 million (current dollars) was allocated to the Subsidiary Agreement but on February 5, 1981, the total allocation was increased to $180 million. Of this amount, the provincial contribution was increased from $100 million to $120 million and the federal contribution increased from $50 million to $60 million.

There were 11 pulp and paper companies which submitted proposals to the Pulp and Paper Subsidiary Agreement. Of these, 10 proposals were accepted involving 20 mills (Table 3-2). The rejection concerned Reed's Dryden Mill because of its poor pollution record.[49]

For the entire province, a total of $187 million (current dollars) was committed in the form of modernization grants. This accounted for about 11.4 per cent of the entire amount of investment committed by the companies to modernize, reduce pollution and improve energy efficiency in their plants. Of this total investment, roughly 80 per cent was committed to modernization efforts, approximately 13 per cent to pollution controls, and the remaining 7 per cent to energy improvements.[50] In addition to PPMP, there were certain other programs, such as the Enterprise Development Program (EDP) and the Industrial and Regional Development Program (IRDP), which provided assistance of about $5 million (current dollars) to three mills which had not received any PPMP grants. These grants were also made available for the modernization of mills. EDP provided such grants to all industries, not just to pulp and paper, while IRDP was essentially a program designed to encourage regional development.

During the first few years of the program, some of the recipient mills experienced some employment losses. But it is not known whether and to what extent these employment losses were the direct result of PPMP. The evidence reveals that, despite the availability of grants, there were several plant closures, mainly due to the severe economic recession during the 1982-83 period. These included the Hawkesbury Mill, owned by Canadian International Paper, the Spruce Falls Mill in Kapuskasing, and the Abitibi-Price Mill in Sault Ste. Marie.[51]

NOVA SCOTIA

In May 1981, the Government of Canada and the province of Nova Scotia entered into a subsidiary agreement, under which a sum of $21,250,000 (current dollars) was established for modernization of the production process, pollution abatement and energy cost reduction. Only three mills were given assistance -- Bowater Mersey, Minas Basin Pulp and Power Company, and Scott

Maritimes (Table 3-3). Like in the case of Ontario, modernization was the primary objective, accounting for about 70 per cent of total investment, followed by pollution abatement, which accounted for antoher 20 per cent.[52]

In the case of one of the mills which did not receive a modernization grant, gove nment officials felt that the mill's major problem dealt with a required processing change rather than with modernization per se.[53] Because of the extensive budworm damage to spruce in the region where the mill was located and a desire to make use of existing hardwood stands, the pulp making process required modification to accept a larger proportion of hardwood than could be used with the existing process. Because this was a much more specific problem than would be the case if the mill simply required modernization, government officials felt that any public sector assistance to the mill could be more appropriately delivered through a program other than the Modernization Subsidiary Agreement. This special assistance was arranged by the Provincial Government. In the case of another mill which also did not receive a PPMP grant, the mill had undergone a fundamental reorganization in terms of its potential product line before the modernization program came into effect, and as a result, it could not immediately come up with further specific modernization plans to apply for assistance.[54] Subsequently, it formulated plans for further mill improvement and received a grant under the Regional Development and Industrial Program (RDIP).

NEW BRUNSWICK

The Canada-New Brunswick Pulp and Paper Subsidiary Agreement was signed in August 1980. It provided for $42.25 million (currrent dollars), of which the federal contribution was $33.8 million. By the end of 1983, five mills had taken advantage of the Agreement for a total of $41 million, leaving only an uncommitted balance of $1.25 million.[55] The investment projects of these mills were considerably in excess of the $375 million (current dollars) estimated by the program administrators at the time the subsidiary agreement was signed. As a result, an amendment increasing the available funds by $11.5 million ($9.2 million federal) was approved by the Treasury Board on March 6, 1984. This amendment brought the revised agreement's total to $53.75 million with a federal contribution not to exceed $43.0 million. These additional funds allowed two more mills to be accommodated under the program. As of April 1, 1985, about $53.25 million (current dollars) had been spent under PPMP (Table 3-3).

In all of the capital investment projects, the main objective was modernization. It represented about two-thirds of the total projected expenditures. Energy conservation and pollution abatement each accounted for less than 20 per cent of the total investment. Canadian content represented about 80 per cent of the machinery and parts purchased by the recipient mills.[56]

QUEBEC

In all, 20 firms received assistance under the terms of the Agreement (Table 3-4). Among these, there were some firms which signed several agreements because of multi-plant ownership. Leading examples are Abitibi-Price which owns three mills, Canadian International Paper which owns four, and Consolidated-Bathurst and Cascades which own five each.

Because of the poor economic situation, there was a delay in the execution of the program. By August 15, 1983, roughly four years after the original Agreement had been signed, only $89 million out of the total $240 million had been spent. As a result of the economic downturn, firms asked for deferrals, cancellations and changes in investment plans.[57] This resulted in a request by industry in October 1982 to expand the eligibility criteria and to extend the program by another two years. However, the Canada-Quebec Management Committee feared that such an extension would result in the postponement of all major projects under the program.

About 75 per cent of the revised investment expenditure went into modernization, 17 per cent for pollution abatement, and 7 per cent for energy conservation (Table 3-5).

No negotiations took place between the federal government and the companies. The five year investment plan that each company had to submit served as the basis for determining the amount to be paid. Negotiations took place only between the provincial and the federal government; the potential for negotiation with companies was reduced by the use of a fixed level of assistance.

In Quebec, pulp and paper companies made no effort to pressure suppliers on the matter of Canadian content. Government officials, both federal and provincial, did ask the companies to justify their purchases of foreign equipment. The Management Committee for the Canada-Quebec Subsidiary Agreement set up a sub-committee to deal with Canadian content. However, some of the program administrators we interviewed mentioned that the recommendations made by the sub-committee to the Management Committee were not actively followed.[58] But an examination of company files shows that the proportion of Canadian content used by Quebec's pulp and paper firms was very high - 80 to 85 per cent, and thus not significantly lower than in other provinces.

NEWFOUNDLAND

Newfoundland was the last province to join PPMP. It did so in 1981. Under the terms of the agreement, the federal government had originally allocated $30 million (current dollars) to Newfoundland based on a cost-sharing formula of a 90 per cent contribution by the federal government and 10 per cent by the provincial government. However, because of the adverse market conditions prevalent during the 1982-83 period, the pulp and paper

industry in Newfoundland was not able to utilize the government funds. In a joint presentation made to the Forest Industry Advisory Committee by the provincial departments of Forest Resources and Land and of development on the Present Status of the Newfoundland Newsprint Industry (June 8, 1983, p. 21), it was argued that if Newfoundland did not utilize the funds made available to it under the modernization program, the pulp and paper industry in that province would lag behind the other provinces. However, it was only after the economy had recovered from the recession in late 1983-84 that many of the pulp and paper firms became interested in the program. Two mills received assistance under PPMP (Table 3-6). They are the Cornerbrook Mill, which was previously owned by Bowater and later purchased by Kruger, and the Grand falls Mill, owned by Abitibi-Price. Because the province was late in joining the program, it received an extension until 1986 to complete the projects for which the funds had been allocated.[59] After PPMP was officially terminated in 1984, the remaining payments were to be made under the Industrial and Regional Development Program.

CONCLUSION

Faced with declining demand for their products, Canadian pulp and paper producers were reluctant to undertake major investment projects. The federal and provincial governments believed that the key solution to the erosion in the international competitiveness of pulp and paper was to increase investment with a view to modernizing the mills. This apparently was the rationale behind the modernization grants program which was launched in February 1979. However, neither the federal nor the provincial governments made any serious attempt to examine the reasons for the deterioration in international competitiveness and how the modernization grants program could remedy this problem. As shown in Chapter 2, the deterioration in international competitiveness in the Canadian pulp and paper industry was due to two factors -- wage escalation and low productivity growth relative to Canada's competitors. These factors were offset to some extesnt by the depreciation of the Canadian dollar relative to the U.S. dollar. Modernization grants were regarded as a means of spurring productivity growth via the subsidization of capital. But, as shown in the previous chapter, capital's role in productivity growth during the 1970s has been relatively minor, not only in the pulp and paper industry, but in other industries as well.

The modernization grants program was essentially a cost-sharing agreement between the federal and provincial governments to undertake investments in the areas of modernization, energy conservation and pollution abatement. The last two objectives were added on since it was felt that they had been neglected and the private sector on its own would not have the incentive to invest in these areas. Once again, no effort was made to find out whether there was a need to government assistance in these areas. The argument which was often advanced in support of government assistance is that due to declining rates of return, the firms

were unable or reluctant to undertake investment in the areas mentioned earlier. But the evidence cited in Chapter 2 shows that profitability in the industry had staged a significant recovery at the time the PPMP was introduced.

Only certain costs were considered to be eligible under the program. Incentive grants were provided as a percentage of these costs. Payments were made in the form of progress payments, or up-front money, or a blend of the two. Firms were encouraged to use Canadian made machinery and equipment.

Quebec, Ontario and the Maritimes signed the agreement. Only British Columbia refused to join it.

There was criticism of several aspects of the program. Of these, the most significant were the objections raised on the need for assistance, the vagueness of the criteria applied, the consequences of the program on capacity utilization, too much reliance on bureaucratic discretion, and the penalization of those who had already undertaken improvements with their own private funds. Some, like the Law Reform Commission, challenged even the legal basis for giving grants.

NOTES

1 For an interesting discussion of the historical details, see Thain, Peter M., "The Political Economy of the Pulp and Paper Modernization Program," unpublished M.B.A. Dissertation, University of British Columbia, April 19, 1984, Chapters 3 and 4.

2 They are the Departments of Consumer and Corporate Affairs, Finance, Fisheries and Environment, Industry, Trade and Commerce, Labour, and Regional Economic Expansion.

3 Department of Industry, Trade and Commerce, Report of the Consultative Task Force on the Forest Products Industry, (Ottawa: ITC, June 1978), p. 2.

4 Price Waterhouse and Company, and Price Waterhouse Associates, A Study of Taxation Practices Related to the Pulp and Paper Industry (? Price Waterhouse), August 1973, Part, 1, Summary, p. 5.

5 Ibid., p. 20.

6 Ontario Ministry of Industry and Tourism, Report of the Special Task Force on Ontario's Pulp and Paper Industry (Toronto: Ontario Ministry of Industry and Tourism), November 16, 1978, p. 3.

7 Ibid., p. 7.

8 Ontario Ministry of Treasury and Economics, Office of Economic Policy, Economic Development Branch, Economic Impact of Capital Expenditure, Pulp and Paper Industry, Ontario, staff report (Toronto: Ontario Ministry of Treasury and Economics), June 1979, p. 2.

9 Ibid., p. 3. They are Terrace Bay Mill, owned by Kimberly-Clark, Thunder Bay Mill, owned by Great Lakes Forest Products, and the Boise Cascades Mill in Fort Frances.

10 Ibid., p. 4.

11 Ontario Ministry of Industry and Tourism, Report of the Special Task Force ..., op. cit., p. 11.

12 In backing up their requests for financial support and relaxed environmental standards, many companies announced extended layoffs and plant closures. For a detailed discussion, see P. Thain, op. cit., Chapter 4, pp. 4-19 to 4-37.

12 The mills which closed down their operations temporarily during 1977 included Domtar's East Angus Mill, Reed's Mill in Quebec City, and Consolidated Bathurst's Wayagamack Mill. For

a detailed discussion on the negotiations between the pulp and paper firms and the two levels of government, see P. M. Thain, op. cit., Chapter 4, pp. 4-19 to 4-37.

13 Department of Regional Industrial Expansion, Pulp and Paper Modernization Study: Volume 1, National Report (Ottawa: DRIE, October 1983), p. 3.

14 Ibid., p. 6.

15 Ibid., p. 6.

16 These calculations are based on data from Canadian Pulp and Paper Association, Reference Tables (Montreal: CPPA), pp. 22, 25, 13, and 21.

17 Department of Regional Economic Expansion, Response of the Federal Government to the Recommendations of the Consultative Task Force on the Canadian Forest Products Industry (Ottawa: DREE, February 1979), pp. 3 and 6.

18 "Industry/government view program," Pulp and Paper Canada, April 1979, p. 11.

19 Ibid., p. 3.

20 Ibid., p. 4.

21 Department of Regional Industrial Expansion, News Release, July 31, 1980, mentioned in DRIE, Pulp and Paper Modernization Study: Volume 1, op. cit., p. 4.

22 "Provinces, Ottawa announced $ involvement in 'National Development Policy' for industry," Canadian Pulp and Paper Industry (Toronto: Maclean-Hunter Inc., June 1979), p. 9.

23 The Hon. Robert Andras, President of the Board of Economic Development Ministers, "National development policy builds on previous plants that have worked," Canadian Pulp and Paper Industry (Toronto: MacLean-Hunter Inc., May 1979), p. 17.

24 Department of Regional Economic Expansion and Office de planification et de développement du Québec, Subsidiary Agreement, Pulp and Paper Modernization of the Industry, 1979-84, Canada-Quebec (Ottawa: DREE and Quebec: Office de planification), May 15, 1979, p. 5.

25 Ibid., p. 7.

26 The Hon. Robert Andras, President of the Board of Economic Development Ministers, "National development policy ...," op. cit., p. 17.

27 The newsprint and pulp capacity figures given here are from Canadian Pulp and Paper Association, Annual Newsprint

Supplements and Lockwood's Directory, National Directory (New York: Vance Publishing Company). I am grateful to an anonymous reference for making this data available to me.

28 The Minister of Regional Economic Expansion, Pulp and Paper Modernization Program, discussion paper (Ottawa: DREE), July 18, 1980, p. 15; also see DREE and Office de planification ... du Québec, Subsidiary Agreement ... Canada-Quebec, op. cit., p. 10.

29 Department of Regional Economic Expansion, Executive Summary: Evaluation of the Canada/Nova Scotia Subsidiary Agreement for Pulp and Paper Modernization (Halifax: DREE, October 1985), p. 8.

30 See, for example, Department of Regional Economic Expansion and Ontario Ministry of Treasury and Economics, The Evaluation Framework to the Canada/Ontario Pulp and Paper Facilities Improvement Subsidiary Agreement (Ottawa: DREE and Toronto: Treasury, September 1982), p. 6.

31 Department of Regional Economic Expansion and Office de planification ... du Québec, Subsidiary Agreement ... Canada-Quebec, op. cit., p. 11.

32 Canada-Ontario Subsidiary Agreement, Pulp and Paper Industry Facilities Improvement (Ottawa: DREE and Toronto: Ministry of Industry and Economics), May 15, 1979, p. 5.

33 Ibid., p. 4.

34 Ibid., pp. 4 and 5.

35 Department of Regional Economic Expansion, "Executive summary: Evaluation of the Canada/Nova Scotia Subsidiary Agreement ...," op. cit., p. 6.

36 Department of Regional Industrial Expansion, "Pulp and paper modernization study," vol. 1, op. cit., p. 10.

37 Ibid., p. 9.

38 Than, Peter M., op. cit., Chapter 6, p. 29.

39 Department of Regional Economic Expansion and Office de planification ... du Québec, Subsidiary Agreement ..., op. cit., p. 11.

40 Department of Regional Industrial Expansion, "Pulp and paper modernization study ...," op. cit., p. 27.

41 Ibid., p. 27.

42 Ibid., p. 29.

43 Law Reform Commission of Canada, Policy Implementation, Compliance and Administrative Law, Working Paper No. 51 (Ottawa: Law Reform Commission, 1986), p. 32.

44 Ibid., p. 46.

45 Jennifer Grass, "Pulp and paper grants may bring problems," Financial Post, September 20, 1980.

46 "Industry/government view program," Pulp and Paper Canada, April 1979, p. 11.

47 Ibid., p. 11.

48 The Auditor General's Department, Report of the Auditor General to the House of Commons for the Fiscal Year Ending on March 31, 1985 (Ottawa: Supply and Services Canada, 1985), pp. 12-142.

49 Thain, op. cit., Chapter 6, pp. 7-16.

50 The Department of Regional Industrial Expansion and Ontario Treasury and Economics, "The evaluation framework to the Canada/Ontario pulp and paper facilities improvement ...," op. cit., p. 34.

51 P. Thain, op. cit., Chapter 6, pp. 6-31.

52 The Department of Regional Industrial Expansion, "Evaluation of the Canada/Nova Scotia pulp and paper subsidiary agreement, op. cit., p. 51.

53 Ibid., p. 51.

54 Ibid., pp. 51-52.

55 Department of Regional Industrial Expansion, Canada/New Brunswick Pulp and Paper Subsidiary Agreement: Monitoring Report Update (Moncton: DRIE, August 1985), p. 1.

56 Ibid., p. 61.

57 See, for example, Le Droit (Ottawa, November 15, 1982), entitled "Programmes de modernisation des grandes sociétés papetières," Mise en veilleuse jusqu'à la fin de 1983.

58 Etude de l'Entente Canada-Québec sur la modernisation de l'industrie des pâtes et papiers, DRIE, October 1983, p. 51; also, DRIE, Pulp and Paper Modernization Study, op. cit., p. 28.

59 "Mill modernization Agreement signed: Local plant could be included," The gulf News (Newfoundland, August 1, 1984), p. 14.

Table 3-1

Allocation of Funds under the Pulp and Paper Modernization Grants Program, 1979-1985

	Cost share Fed: Prov.	Amounts paid up to April 1, 1985 Federal	Provincial	Total	As a percentage of provincial industry value added (1980)
	(Per cent)	(000 current dollars)			(Per cent)
Newfoundland	90:10	38,265	4,252	42,517	
Nova Scotia	80:20	14,992	3,748	18,740	12.2[1]
New Brunswick	80:20	42,600	10,650	53,250	
Quebec	56:44	135,085	106,143	241,228	13.6
Ontario	33:66	62,163	124,326	186,489	15.4
Total		293,104	249,119	542,224	

1 This figure refers to all of the Maritime provinces combined.

Source Based on data provided by Forest Products Directorate, DRIE.

Table 3-2

Allocation of Modernization Grants - Ontario, 1979-85

Company	Mill location	Total amount* paid (1 April 1979 to 1 April 1985) ($000 current dollars)
Abitibi-Price	Fort William Iroquois Falls Sault Ste. Marie Smooth Rock Falls Thorold Thunder Bay	22,497
American Can	Marathon	3,000
Boise Cascade	Fort Frances Kenora	20,001
Domtar	Cornwall, Red Rock and Trenton	15,753
E.B. Eddy	Espanola and Ottawa	24,999
Great Lakes	Dryden and Thunder Bay	48,048
James River Marathon	Marathon	12,198
MacMillan Bloedel	Sturgeon Falls	1,005
Ontario Paper Products	Thorold	31,998
Spruce Falls Pulp & Paper	Kapuskasing	6,990
	Total	186,489

Other Grants		Federal Amount
Miller Brothers	Trenton[1]	3,000.0
St. Mary's Paper Co.	Sault Ste. Marie[2]	2,000.0
Strathcona Paper Co.	Strathcona[2]	8.5
	Total	5,008.5
Grand Total	186,489 + 5,008.5 = $191,497.5	

* Federal and provincial governments' contribution.
1 Enterprise Development Program (EDP).
2 Industrial and Regional Development Program.

Source Based on information given by Forest Products Directorate, DRIE.

Table 3-3

Allocation of Modernization Grants - Nova Scotia and New Brunswick, 1979-85

Company	Mill location	Total amount* paid (1 April 1979 to 1 April 1985) ($000 current dollars)
	Nova Scotia	
	(A) MODERNIZATION PROGRAM	
Bowater Mersey	Liverpool	11,000
Minas Basin Pulp & Power	Hantsport	740
Scott Maritimes	Abercrombie	7,000
	Total	18,740
	(B) OTHER GRANTS	Federal Amount
Canexel	East River[1]	51.50
Smith & Squires Papermaker	Bear River[1]	29.40
	Total	80.90
Grand Total for province		$18,820.90
	New Brunswick	
	(A) MODERNIZATION GRANTS PROGRAM	
Boise Cascade	Newcastle	4,000
Fraser	Atholville	17,000
Irving	Saint John	6,750
Lake Utopia Paper	St. George	2,500
New Brunswick International Paper (NBIP)	Dalhousie	12,500
Rothesay Paper	Saint John	5,500
St. Anne Nakawic	Nakawic	5,000
	Total	53,250
	(B) OTHER GRANTS	Federal Amount
Consolidated Bathurst	Bathurst[2]	19,600
Fraser	Edmunston[1]	1,386
	Total	20,986
Grand Total for provinces	53,250 + 20,986 =	$74,236

1 Regional Development Incentives Program (RDIP) administered by DREE.
2 General development Agreements (GDA) administered by DRIE.
* Federal and provincial governments' contribution.
Source Based on data provided by Forest Products Directorate, DRIE.

Table 3-4

Allocation of Modernization Grants - Quebec, 1979-85

Company	Mill location	Total amount* paid (1 April 1979 to 1 April 1985) ($000 current dollars
(A)	MODERNIZATION PROGRAM	
Abitibi-Price	Beaupré, Chandler, and Kénogami	26,400
Bennett	Chambly	346
Cascades	Breakeyville, East Angus, Jonquière, Kingsley Falls	9,429
Canadian International Paper	La Tuque, Gatineau, Matane, Trois Rivières	8,123
Consolidated Bathurst	Grand Mère, New Richmond, Portage du Fort, Port Alfred, Shawinigan, Trois Rivières	42,731
Domtar	Dolbeau, Donnacona	11,851
Donohue	Clermont	24,025
E.B. Eddy	Hull	4,718
Glassine	Limoilou	618
ITT	Port Cartier	3,014
Kruger	Bromptonville, Trois Rivières	9,029
MacLaren	Masson, Thurso	43,066
Perkins	Candiac	2,146
Reed	Limiolou	25,989
Rolland	Mont Rolland and St. Jérôme	3,509
Scott	Crabtree and Lennoxville	2,145
F.F. Soucy	Rivière-du-Loup	3,579
St. Raymond	Chute Panet	5,164
Tembec	Témiscaming	8,228
Q.N.S.	Baie Comeau	7,118
	Total	241,228
	(B) OTHER GRANTS	Federal Amount
Quecell Canada	Magog[1]	20
Recuperation St. Laurent	St. Anne Bellevue[2]	215
Produits Converdis	Lanoraie[2]	38
J.J. Barker	Cowansville[1]	395
	Total	668
Grand Total	241,227 + 668 = $241,896	

1 Regional Development Incentives Program (RDIP).
2 Industrial and Reginal Development Program (IRDP).
* Federal and provincial governments' contribution.
Source Based on information provided by Forest Products Directorate, DRIE.

Table 3-5

Investment Expenditure Plans -- Quebec (1979-1987)

	1979	1987	Total	Per cent of total
		(1978 $)		
Modernization				
Initial	136,170		1,356,992	72.5
Revised	125,765	48,250	1,620,447	74.5
Pollution				
Initial	1,852		368,492	19.5
Revised	886	15,505	371,587	17.0
Energy Conservation				
Initial	5,911		37,458	7.5
Revised	3,109	-	156,562	7.0
Other				
Initial	-		9,000	0.5
Revised	1,710	700	26,730	1.5
Total				
Initial	143,933		1,871,942	100.0
Revised	131,450	64,455	2,175,603	100.0

Source Expansion industrielle régionale, Étude de l'entente Canada-Québec sur la modernisation de l'industrie des pâtes et papiers (Ottawa: DRIE, October 1983), annexe B, Table 5.

Table 3-6

Allocation of Modernization Grants - Newfoundland, 1979-85

Company	Mill location	Total amount* paid (1 April 1979 to 1 April 1985) ($000 current dollars)
	(A) MODERNIZATION PROGRAM	
Abitibi-Price	Grand Falls	6,196
Kruger	Corner Brook	36,321
	Total	42,517
	(B) OTHER GRANTS	Federal Amount
Abitibi-Price	Stephenville[1]	13,500
Grand Total	42,517 + 13,500 = $56,017	

1 General Development Agreement (GDA) administered by DRIE.

* Federal and provincial governments' contribution.

Source Based on information provided by Forest Products Directorate, DRIE.

4 EVALUATION OF THE MODERNIZATION PROGRAM

The last two chapters presented an overview of the pulp and paper industry, some of the salient features of the Modernization Grants Program, and public reaction to it. This chapter evaluates the efficacy of the program. In the evaluation of PPMP, we consider several fundamental issues. First and foremost, was there a problem which merited government intervention? And was PPMP the least costly way of correcting the problem? To answer the first question, we examine the rationale for intervention. To answer the second question, we discuss the problems associated with firm-specific subsidies (of which PPMP is a good example) and the issue of incrementality. Next we proceed to a general discussion of whether the program was able to achieve its objectives. In this context, we look at a number of aspects of the program including its impact on investment, the allocation of grants, the implementation process, and some of its unintended side effects. In the analysis of these issues, we rely on a priori reasoning and statistical tests as well as on several case studies. But because of confidentiality and the fear that a lengthy discussion would reveal the names of the players involved, the discussion of the case studies is kept to a bare minimum.

RATIONALE FOR GOVERNMENT INTERVENTION

The pattern of industrial activity is subject to change which can be extensive over periods of a decade or more. New technologies replace old, so some firms and mills become obsolete. Changes in international trade have an impact on national industrial structure, thereby necessitating adjustment. Thus, an economy, regardless of whether it is growing at a healthy rate, often includes industries that are declining and industries that have to adjust to change irrespective of their growth rate.

Some believe that governments should intervene to restructure the economy by facilitating the transfer of resources from declining sectors or sectors characterized by declining growth to faster growing sectors. Public policies which are designed for this purpose are loosely described as adjustment policies. As mentioned in Chapter 2, the pulp and paper industry experienced a long period of declining demand and productivity growth during the 1970s and 1980s. The modernization grants program can be considered to be an adjustment policy in so far as its objective was to improve the productivity of the industry and enable it to meet the competition from abroad.

Why should governments intervene? The classic argument which is found in the literature runs in terms of market failure or externalities.[1] Externalities arise when market forces are unable to take into account some important cost or benefits of a project. An example would be a research and development project which would ultimately be in the social interest. If the firm undertakes the project, it will not be able to fully capture its benefits. Hence

there is no strong incentive for a firm to undertake research and development on its own. Clearly then there is an externality in this case because of the divergence between private and social costs and benefits. Under the circumstances we can move on to the second step of specifying the minimum conditions necessary for government subsidization of R&D projects.[2] Similarly, the analysis of the modernization grants program should start with a discussion of externalities or market imperfections. Once these externalities have been identified, we can consider the minimum conditions for intervention. On the other hand, if there are no significant market imperfections, any discussion of minimum necessary conditions for assistance is superfluous.

We first discuss the case of capital market imperfections. In a well functioning market system firms are constantly exposed to various types of economic shocks -- e.g., decline in demand, changes in input prices, union strikes, etc. -- and consequently, must face the prospect of capital losses from time to time. But such capital losses are not an indication of capital market failure. These capital losses are private costs incurred by the investor and not social costs. Society simply revalues the capital assets at whatever they may be worth in their next-best investment opportunity. Thus, if some pulp and paper mills had to be closed, the government should not intervene either to prevent the capital losses or to compensate the investors. On the contrary, the government should encourage the adjustment process by removing the impediments to capital mobility. Such action could take various forms ranging from the elimination or modification of unduly restrictive anti-trust policies relating to mergers and takeovers to tax reform designed to reduce the cost of takeovers.

It is sometimes alleged that lending institutions treat some firms differently from others even though in terms of risk there is no difference between them. The argument is usually applied to small business lending and hence is not really applicable to the pulp and paper industry where the firms tend to be quite large and undertake financing in the open market and sometimes in the global financial market. Nonetheless, the argument is not very strong because several studies which have been undertaken on this subject at the Council and elsewhere have found no empirical evidence to support this hypothesis.[3] Moreover, even if some empirical basis for the argument can be found, before a case can be made for government intervention, it must be demonstrated that such intervention would lower the costs incurred by private financial institutions in lending to groups which are supposed to be subject to such differential treatment. In general, there is no reason to believe that the government has a comparative advantage in this field.

Turning next to labour market imperfections, the case for government intervention appears to be much stronger than in the case of capital market imperfections. Workers employed in declining industries and who are vulnerable to layoffs would

desire to acquire new skills through retraining as well as to obtain information concerning the availability of jobs. In both of these areas, there are market imperfections. A worker who desires retraining cannot use his human capital as collateral to borrow funds unlike a firm which would use its physical capital to borrow in order to finance some part of its operations. Moreover, in the case of general training which increases the mobility of labour a firm would not be interested in paying for its cost because of its inability to capture the full benefits of such training. With regard to job related information, workers do not have the same degree of access that a firm has to information regarding markets, investments, etc. Nor is it in the interests of a firm to provide information on the availability of jobs in a particular region or community since there is no assurance that the workers using the information would join the firm. Thus there is a valid rationale for government intervention to provide general training and information on jobs.

In addition to the labour externalities mentioned earlier, congestion externalities may be used to justify a temporary subsidy to firms. Congestion externalities arise when after the plant closure, the search procedures of some job seekers lead to an increase in the search costs of others. Such congestion externalities would arise when mass layoffs occur in communities dominated by a single firm and when the economy is already experiencing high unemployment. Because pulp and paper mills are located in single industry towns and because of the high unemployment in the economy during the period when the modernization program was established,[4] one may be tempted to apply the congestion externality argument to the pulp and paper industry. Specifically, it could be argued that the government is justified in giving a temporary subsidy to the pulp and paper firms to maintain employment until the congestion in labour markets has been reduced, or until the next upturn in the economy. However, several caveats are in order. First, one could argue that congestion externalities are not a valid ground for a subsidy because wages in single industry towns have already been adjusted by the market system to reflect the risk of layoff. In that case, a temporary subsidy would amount to an overcorrection of the problem. Second, even if the congestion externalities argument is valid, there is no reason why the pulp and paper industry should be singled out for such special treatment when firms in other industries have also experienced similar problems. Third, a subsidy to maintain employment postpones the realization of gains from allocative efficiency and does nothing to ensure that workers acquire skills that make them employable in other occupations and industries. Thus, one cannot completely rule out the possibility that temporary firm subsidies based on congestion externalities will not impede adjustment. Fourth, a policy of subsidies will encourage more firms and workers to enter the industry which is currently receiving the subsidy, thus largely offsetting or undermining the original objective of the subsidy, namely, to reduce congestion in labour markets. Finally, at most congestion externalities would be an argument for temporary protection during

a very severe recession. In the context of the pulp and paper modernization program, even though the period when it was introduced was one of high unemployment, one could hardly call it a period of severe recession.

Up to now, the discussion has focused on imperfections in factor markets. But there could also be imperfections in commodity markets. For example, Harris (1984)[5] contends that firms are able to undertake an efficient adjustment to a decline in demand in competitive industries with no scale economies. But if there is some degree of indivisibility in plant or firm size so that efficient firm adjustment to a decline in demand requires that firms exit in some orderly temporal sequence, market forces may not produce this sequence. Thus, the government may be able to play a role in managing adjustment to the decline in demand, perhaps through the active promotion of mergers, compensation for scrapping physical capacity etc. Since the pulp and paper industry exhibits increasing economies of scale as discussed in Chapter 2, it may be tempting to apply this argument to the pulp and paper industry to make a case for government intervention. However, Harris' argument has yet to be empirically tested. If it is sound, there is the danger that it may be quickly generalized to make a case for pervasive government intervention in many sectors. Another issue which needs clarification is why the government is able to economise on transaction costs (which is the implicit assumption on which Harris' argument is based) in ways which are not open to private firms.

It is sometimes claimed that government intervention is needed to assist certain industries which are subject to "unfair" competition from abroad. Because of subsidies given by foreign governments to their industries, it is claimed that domestic firms are unable to compete with foreign imports and hence it is argued that domestic firms should also be given similar subsidies. This complaint was mentioned, for example, by the Consultative Task Force on the Canadian Forest Products Industry (1979) which was discussed in Chapter 3. However, we have already seen that the pulp and paper industry is one of the most heavily subsidized industries in the Canadian manufacturing sector. Furthermore, if subsidies such as tax incentives are having an adverse effect on domestic producers, Canada has certain avenues open to it, as outlined in the GATT, Code on Subsidies and Countervailing Duties (1979). Article 13 of the GATT code describes the procedures to be followed in the case of conciliation, dispute settlement and countermeasures, if foreign subsidies are found to be causing disruption in domestic markets. The fact that Canada has not made use of these procedures so far with regard to pulp and paper seems to suggest that foreign subsidies are not a major problem in this industry.

It is sometimes mentioned that government intervention is justified if it is restricted to industries which are not currently competitive but which could become competitive in the future with government aid. The pulp and paper firms seem to have

used this argument to their advantage. But it is not very convincing. If left to themselves, firms in an industry will adjust on their own, because failure to respond to market forces leads to heavy losses. If the government intervenes, adjustment will occur too rapidly, with serious adverse consequences. For example, government assistance could lead to the rapid expansion of an industry which in turn may result in excess capacity, a fall in prices and profits, and demands for further government assistance. Thus forcing an industry to adjust faster than it otherwise would is as bad as not adjusting at all.[6]

Of the problems that PPMP addressed, pollution abatement is probably the only area where externalities are important. Although the subject of pollution is controversial,[7] it is not immediately evident that modernization grants are the optimal solution. Indeed, some have argued that the optimal solution is a tax imposed on the polluters. In any case, pollution abatement played only a minor role in PPMP, accounting for about 10 to 15 per cent of the total amount of grants paid.

To sum up, we have examined the economic rationale for government intervention in declining sectors. Although pulp and paper is not a declining sector, many of the same arguments have been applied to this industry. With regard to capital, there does not appear to be a justification for government intervention. But the case for intervention is much stronger with respect to labour. A related issue which must also be considered is the cost effectiveness of government intervention. A program is considered cost effective if its social rate of return exceeds the private rate of return and if this differential is at least equal to both the social rate of return of other activities which have been neglected in the process and the social cost of administering the program. Unfortunately, there is no published evidence to show that any analysis was undertaken on this aspect. In terms of cost effectiveness, it is also useful to examine the form of intervention or the policy instrument to be used. The literature on optimal intervention in the presence of domestic distortions[8] provides valuable insights on this issue. It argues that the choice of policy instrument is determined by the source of market imperfection. If the imperfection originates in output markets, a policy instrument <u>directly</u> aimed at factor markets is not optimal because it would lead to imperfections elsewhere in the economy and cause a reduction in real income per capita. On the basis of this finding, it would seem that a capital subsidy such as PPMP can be justified only if it is used to correct an imperfection originating in capital markets. But we have argued that capital markets seem to function rather efficiently. The only problems we can think of are those originating in labour markets which we have already discussed -- i.e., training and job information. For these, the optimal policy instruments are labour market adjustment policies such as retraining programs, mobility grants, portable pensions, better information gathering and dissemination regarding jobs etc., all of which are geared to the worker and not to the firm, like in the case of PPMP.

FIRM-SPECIFIC VERSUS GENERAL POLICIES

Once a decision has been made to assist the firms in an industry, the next important question to consider is the most efficient or the least costly way of doing it. This leads to a discussion of the various forms of intervention. Government intervention can take various forms, which can be divided into three broad categories - general policies, industry-specific policies and firm-specific policies.[9] General policies affect all firms in an industry. Examples of such policies are tax incentives, and tariffs applied to all industries alike. General policies are to be contrasted with industry-specific and firm-specific policies which are applied to only selected industries and firms. Trade restrictions applied on selected imports (e.g., footwear, textiles and clothing) and pollution controls applied to pulp and paper mills are examples of industry-specific policies. Firm-specific policies are designed to influence the amount, distribution and location of investment among firms in an industry. The Modernization Grants Program is firm-specific in the sense that the allocation of funds is at the discretion of the program administrators. Each applicant submits his application to the relevant management committee which reviews it and decides whether to accept or reject, the amount to be given, and the conditions attached to the grant.

To show how these policies differ from one another, we start with a general policy of subsidization. Assume that there are only two industries - pencils and shirts. Also assume that the elasticities of demand and supply are the same in both industries. Initially, the equilibrium price and quantity in both industries are given by P_0 and Q_0 (Figure 4-1). Now the government decides to subsidize the two industries at the same rate.[10] It can subsidize either the consumers or the suppliers. Assume that it decides to subsidize the suppliers. As a result of the subsidy, the supply curves in both industries shift to the right, output increases to Q_1, and prices decline to P_1. Since the rate of subsidy is equal in both industries, there is no tendency for resources to move from one industry to the other.

Now suppose the government feels that because of a stringent budgetary constraint it could assist only one industry. Assume that it feels that the pencil industry suffers from a lack of international competitiveness to a much greater extent than the shirt industry. The government has several courses of action open to it. These include trade restrictions, a reduction in sales tax, a subsidy to domestic producers of shirts or encouraging the exit of firms from the industry. Assume that after weighing the pros and cons of each of these options, the government decides in favour of a production subsidy. The supply curve shifts to the right, resulting in an increase in output from Q_0 to Q_1 and a decline in price from P_0 to P_1. The total cost of the subsidy is given by the rectangle P_1P_2BC. Of this amount, the consumers of pencils get a windfall gain equal to $P_0AC\ P_1$, while the producers get a windfall gain equal to P_0P_2BA. The triangle BAC is the

deadweight loss of the subsidy which can be defined as the loss of efficiency or productivity resulting from the transfer of resources from low-cost sectors to the high-cost sector which is receiving the subsidy. As a result of the subsidy, some of the firms in the shirt industry will find it attractive to move into the pencil industry in order to benefit from the government subsidy. Consequently, there will be a further shift in the supply curve for pencils to the right, leading to a further increase in production and a further reduction in price. Exactly the opposite occurs in the shirt industry. The supply curve for shirts shifts to the left, price increases and output of shirts contracts. Thus, an industry-specific subsidy induces a reallocation of resources in favour of the subsidized industry, unlike the general subsidy discussed earlier. Since the reallocation of resources tends to reduce the overall level of productivity and hence economic welfare, industry-specific subsidy programs are a less efficient way of assisting firms than a general subsidy program applied on an economy-wide basis.

Now suppose the government wishes to economize by restricting the subsidy to only those producers who would not be in the pencil industry otherwise. In other words, the government moves from an industry-specific to a firm-specific subsidy. The government will start with the highest cost pencil producer by giving him a subsidy equal to BC, a slightly smaller subsidy to the next high-cost producer and so on until it comes to the marginal producer at X. In this example, the marginal pencil producer does not get a subsidy but all those producers with costs higher than his - the extra-marginal producers - get the subsidy. This is what is meant by subsidization at the margin. Also note that the marginal producer in this example is not the one who produces at Q_0 but the one who produces at Q_2, since the new price is no longer at P_0 but at P_1 (Figure 4-1).

At the new price of P_1, some of the producers who originally used to produce without a subsidy also end up getting a subsidy - that is, the producers operating in the AX range. The cost of the subsidy is equal to BCX, which is considerably smaller than the cost of the industry-specific subsidy discussed earlier - that is, P_2P_1BC. Note, however, that the entire area BCX does not represent a deadweight loss; the latter is restricted to the area BAC.

The firm-specific subsidy or subsidization at the margin would work if the administrators of the program can identify the marginal producers. For such identification to be possible, there must be significant differences in efficiency among the producers. Suppose the government decides to overlook this problem and opts for subsidization in a situation where all producers face similar costs. In this case, those who receive the subsidy have a competitive advantage over others who have not got the subsidy. As a result, the subsidy will have the effect of driving out of business some of the efficient producers who used to produce earlier without a subsidy and replacing them with inefficient

producers who would not have entered the industry if not for the subsidy. The ultimate effect of the subsidy is an increase in the costs of production, but no change in production. Thus a firm-specific subsidy is generally inferior to an industry-specific subsidy unless the marginal producers can be clearly identified and given the exact amount of subsidy needed to undertake the project. But the identification of marginal producers is generally very difficult. Whereas in the case of an industry-specific subsidy the only information the government needs to know is the daily output of the industry, in the case of a firm-specific subsidy it requires detailed information on the costs of each and every producer in the industry. The government should also know the exact amount of subsidy to be given to each producer. Anything more than the exact amount would give the recipient an advantage over others and lead to the displacement of efficient producers noted earlier. We will have more to say on these things later. For the present, suffice it to note that these informational requirements place an enormous burden on the government especially because of the temptation on the part of the producers to distort information for their own benefit.

Before concluding this section, a few additional issues should be considered. In the foregoing discussion, the sole focus was on the deadweight loss. However, a criticism that may be levelled at this approach is that it is too narrow since it overlooks several other social costs/benefits which may also be relevant and important. One of these is the location of firms in single-industry towns and the congestion externalities associated with layoffs, which has already been discussed. Another is that layoffs would produce such social problems as an increase in crime, suicide, marriage breakdown, a decline in property values, etc. To a considerable extent, these problems are unavoidable in any economy. Moreover, some of these problems such as house prices may have been adjusted by the price system to reflect the risk premium in which case intervention would produce an over-correction just like in the case of wages mentioned earlier in the context of congestion externalities. In general, however, it is not clear whether a subsidy to firms is the most efficient means of correcting the social costs of unemployment since even a temporary subsidy may impede the desired adjustment. Finally, the discussion up to now has not taken into account the social costs of financing a subsidy, which a recent Council study[11] demonstrates to be considerable. It estimates the social costs of financing, consisting mainly of the deadweight loss of taxation, to be about $0.81 per dollar of subsidy paid. This implies that a dollar of subsidy should generate at least $1.81 of new output/investment just to break even. This strengthens the case against the subsidization of firms, because quite apart from the other problems mentioned so far such as the identification of firms in need of assistance and the determination of the amount of subsidy, these subsidy programs also tend to be a very expensive way of assisting firms.

INCREMENTALITY

One of the most important questions that must be answered in connection with any type of subsidy is whether it has contributed to an increase in investment or output which otherwise would not have been forthcoming. This is the issue of incrementality about which a great deal has been written.[12] Incrementality could be related to a single firm, industry or the economy.

Incrementality at the firm level implies that the recipient firm would not have undertaken the project without the subsidy. The subsidy is incremental to the industry only if the new project is not at the expense of some other project within the same industry. For example, a firm may require a grant to undertake a particular project. But it is quite conceivable that some other firm would have undertaken the same project without a grant. In that case, the subsidy is incremental to the firm but not to the industry. All that the subsidy did was to substitute a high cost producer for a low cost producer.

A grant would be incremental to the economy only if it does not displace some other investment elsewhere in the economy. The issue of a subsidy for a particular project may lead to an increase in taxation. It may also lead to an increase in wage rates and other factor prices. These factors, in turn, may discourage private consumption or private investment. If private investment is discouraged, the subsidy is not incremental to the economy since it has resulted in the substitution of one kind of investment for another. To be incremental at the level of the economy, the subsidy should lead to new investment projects being undertaken at the expense of private consumption.

In terms of theoretical correctness, incrementality to the economy is a clear first choice, followed by industry -- and firm-incrementality, in that order. But in terms of the easiness of measurement, the order is reversed, with the economy-wide measure being the most difficult and firm-incrementality the least difficult. In the rest of this chapter, the sole focus is on firm incrementality which is the minimum test a project must pass to be considered as incremental. Incidentally, firm incrementality is also the only measure of incrementality mentioned in the progress reports on PPMP prepared by DRIE.

DOMESTIC FACTOR CONTENT

Quite often governments impose restrictions on the behaviour of firms which are given subsidies to undertake investment. While these restrictions do not necessarily affect the incrementality of the subsidy, they may actually produce certain unintended side effects which could thwart the attainment of the main objective(s) of the program. One such restriction is the condition that the recipient firm should use only domestically produced materials and parts, etc. The objective of the policy is to expand employment in the domestic sector producing these parts and materials. This

is very similar to tied aid and has the effect of raising the costs of production for the recipient firms, thereby making it more difficult for the firms in the industry to become internationally competitive which incidentally is the primary objective of the subsidy. In Figure 4-2, before the subsidy was issued the industry employed only foreign materials. As a result of the content requirement, the supply curve shifts upwards from S to S^2. The subsidy now increases from XCB to EXCBF, with EXBF going to the sector producing parts and materials. This analysis assumes that the firm is paid a subsidy for using Canadian content. This is an important assumption, to which we will return later. If the increase in the demand for domestic materials causes the real wage rate to increase considerably, the demand for labour in this particular sector may fall, contrary to the stated objective of the policy of domestic content protection.

THE IMPACT OF THE MODERNIZATION PROGRAM

In the preceding sections it was suggested that there is no valid rationale for a capital subsidy program such as PPMP. Furthermore, on the basis of a priori reasoning, we expressed skepticism regarding the efficaciousness of such firm-specific subsidy programs. In this section we carry the analysis a step further by examining whether the objectives of the program were fulfilled.

PPMP provided subsidies to mills which accounted for about 80 per cent of total pulp and paper capacity in eastern Canada. The mills which received grants were discussed in the previous chapter. The principal objective of the program was to improve the international competitiveness of the industry through the modernization of pulp and paper mills. Thus the main impact of the program would be felt on investment. To test this hypothesis, we tried to isolate the factors relevant to investment behaviour of the firm so that we could assess the contribution of the grants program to investment. Five firms were chosen for the regression analysis, as these were the only ones for which we were able to get the data. They accounted for 35 per cent of the total amount of grants given by both the federal and provincial governments.

To assess the impact of the grants program, we fitted the following investment equation:

$$I = f(Q,R,G,CU)$$

Where I = real investment
Q = real output
R = real interest rates
G = modernization grants
CU = capacity utilization in the paper and allied industry.

The dependent variable is total real investment undertaken by the firms during the 1961-84 period. Note that this is not the

same as real investment in pulp and paper operations because of the diversified nature of some of the firms in the sample.

Among the independent variables, R and Q hardly need an explanation because they appear in every standard investment equation. R captures the sensitivity of real investment to real interest rates and enters the equation with a negative sign. Q represents the accelerator effect and the elasticity of I with respect to Q should be close to one. In formulating their investment expectations, firms may take into account not only the demand for their own products, but also the demand conditions facing the industry in general. CU is supposed to capture this industry effect on a firm's investment decision. In addition to these, we also experimented with certain cash flow variables, i.e., net cash flow as a per cent of sales (CF), retained earnings as a per cent of sales (RE) and net profits as a per cent of sales (NP). In some cases, we also used net earnings per common share (NEC).

The main focus of attention is on the grants variable, G. The receipt of an incentive grant may either increase the total investment expenditures of the recipient or leave it unchanged. Consider, for example, two investment projects, A and B, which a firm is planning to undertake. Only A is eligible for a grant. For 2 x dollars which the firm invests in A, the government gives a grant of x dollars. If the recipient goes ahead with project A which it would not have undertaken otherwise (an extra marginal project) and its investment on B is unchanged, then total investment will increase by more than the amount of the subsidy. The coefficient of $G \geqslant 1$ (Table 4-1).

If the firm goes ahead with project A but reduces its investment on project B by 2 x dollars, then total investment will increase by the amount of the subsidy. In this case, the coefficient of $G = 1$.

In the third case, the firm invests 2 x dollars on project A for x dollars of grants, but reduces its investment on B by 3 x dollars. In this case, there is no increase in total investment and the coefficient of $G = 0$. Thus, except in the first case, in the other two situations the firm is expanding project A at the expense of project B. As a result of this substitution, it is conceivable that the subsidy sometimes may result in no net increase in total investment, as we saw in the third case.

Except for real interest rates and the grants, all the data were taken from the annual reports of the companies. Nominal investment was converted into real terms by using the deflator for investment in machinery and equipment in paper and allied products. Nominal total sales was deflated by the value added price deflator for paper and allied products. We used the same deflator to express the cash flow variables and G in real terms. To construct a series for real interest rates, we adjusted the

long-term government bond rate (10 years and more) by the expected rate of inflation. The data on price deflators, nominal interest rate and the expected rate of inflation are from the CANDIDE data bank and CANSIM, while the data on grants are from the company files at DRIE. For reasons of confidentiality, the names of the firms have been deleted.

Because investment tends to respond to certain economic variables with a lag, we decided, after some initial experimentation, to use a distributed lag in some instances.

The results of the regression analysis are shown in Table 4-2. Only the "best" equations are mentioned. Several comments are in order. First, the explanatory power of the equations is reasonably good when one takes into account the micro nature of the data. Second, only the deflated sales variable performs consistently well in all the equations. Third, the capacity utilization variable was significant in one instance when used alone, but not when used along with deflated sales. In general, the results obtained with capacity utilization were inferior to those with deflated sales. Fourth, in no instance were the cash flow variables or the real interest rate found to be significant. Fifth, the grants variable lacked statistical significance in all of the equations. This means that the incentive grants program had no effect on <u>overall</u> investment undertaken by the firm. Note that we are unable to judge from these equations what impact the grants program had on pulp and paper investment. Suppose real investment in pulp and paper operations increased as a result of the grants program. Our results suggest that this increase was offset by a corresponding decline in other investment undertaken by the firm. Finally, the magnitude of the coefficient of the grants variable is also important because it shows whether a dollar of grants produced a dollar of new investment. In all cases, the numerical value of the G coefficient was much less than one. In short, the modernization grants program had no significant effect on the overall investment of the five firms in the sample.

The foregoing analysis suffers from several limitations. One is that the cut-off date is 1984, by which time some of the firms which received the grants may not have been able to complete their investment programs. This is a valid criticism but we do not believe it is serious enough to invalidate our results. Even if the investment programs had not been completed, the impact of the grants on real investment should still be noticeable. This, we were not able to detect at all. Another criticism that can be made is that we have omitted many other relevant variables and hence, our results should be rejected. As mentioned before, we experimented with several variables but did not find them to be statistically significant. A third criticism is that the analysis suffers from a degree of freedom problem due to the small number of observations used in the statistical testing and hence the results are not robust. However, we did not detect a major degrees of freedom problem in any of our tests. Finally, there is

the problem of data limitations. In several instances, we used data from paper and allied products as proxies (e.g., as price deflators). We do not know the extent of bias caused by this procedure. Hence the reader is warned about the tentative nature of our findings.

These results are in conflict with the evidence presented in a progress report on the Modernization Grants Program published by DRIE.[13] This evidence is presented in the form of leverage ratios which are defined as the ratio of firms' investment in modernization, pollution abatement and energy conservation to the modernization grants received. Leverage ratios of 15.5, 9.3, and 8.4 were mentioned for Ontario, New Brunswick and Quebec respectively. On the basis of these leverage ratios, the progress report pronounced the program to be a success. There are several problems with these leverage ratios. First, one cannot attribute all of the increase in investment in the three areas mentioned above solely to the grants program without first isolating the contribution of the other factors. Second, the leverage ratios are based on the assumption that firms' investment in other activities has remained unaffected by the grants program. Although we have no way of proving it, our results seem to suggest that this has not been the case.[14]

MODERNIZATION GRANTS: IMPLEMENTATION PROCESS

In the previous section it was reported that the grants program apparently had failed to influence the level of investment of the recipient firms. What then are the reasons for this? In our search of explanations, we first looked at the implementation process. Specifically, on what basis were the grants given? Since the main, if not the sole, source of information available to the administrators was the application form filled out by each firm, it is important to take a look at this document to find out to what extent it helped the administrators to make up their minds whether to accept or reject the application and how much to give each applicant. Once an application was received the Department of Regional Economic Expansion prepared an evaluation, with the cooperation of provincial officials and other federal departments such as Industry, Trade and Commerce.

Each applicant was asked to provide a detailed description of his investment program planned for the next five years. In this detailed description, he was requested to give estimates of expenditure committed prior to the submission of the application. The purpose of this question was to enable the policymakers to obtain information on the net increase in investment attributable to the grant. The planned investment expenditures also had to be broken down into modernization, energy conservation, and pollution abatement since these were the three major aspects covered by the Modernization Grants Program. In addition, the applicant had to provide a detailed listing of all the machinery and parts needed and the sources of supply so that the administrators could determine, among other things, the extent of Canadian content.

The applications also had to contain estimates of expected improvements in efficiency at the mill resulting from this investment program presumably to enable the policymakers to assess the contribution of the grants program to the productivity of the mill. In addition, the application had to provide an estimate of the rate of return required to carry out the investment so that the policymakers could determine the amount of incentive needed.

Among the foregoing questions, easily the most important were those relating to the rate of return required to undertake the project without the subsidy and the investment expenditure planned for the five years as distinct from expenditures already committed. These questions are important because they are meant to provide the policymakers with the information needed to estimate incremental investment arising from the investment grant. However, we came across many instances where information on the required rate of return was either vague or completely missing.

In general, this questionnaire method is a poor method for estimating incrementality. In the first place, as mentioned before, there is the obvious incentive for the applicant to present the figures on the required rates of return in such a manner as to qualify for the maximum grant possible. In the second place, and more important, the applicant is in no position to comment on whether this investment would have been undertaken by some other firm without the grant. Nor could he provide information on whether this increase in investment is at the expense of investment elsewhere in the economy. Thus, the best that the questionnaire method can provide is an estimate of incrementality to the firm, not to the industry or the economy.

It is not clear how much importance government officials attached to the incrementality issue. Some federal officials have stated that incrementality was not a major consideration in the grants program. The Hon. Robert Andras, the then President of the Board of Economic Development Ministers, was aware of the problem of measuring incrementality but remained optimistic. He stated:[15]

> It is obvious, though, that the decision as to whether a project would go ahead without assistance will require some discretion on the part of those analyzing the submissions. While there will be gray areas where judgement will be required, firms will have a good idea which projects will merit government assistance. Investments which are profitable without government assistance will not be supported and will obviously go ahead in accord with a company investment plan irrespective of the program announced.

The government officials at least at the federal level were more concerned with an entirely different set of questions. The then Department of Regional Economic Expansion (DREE) played the dominant role at the federal level in the sense that it served as

the principal contact for the provincial governments and prepared the evaluation of various projects. The Department of Industry, Trade and Commerce (ITC) was mainly interested in the technical feasibility and the marketability of the investment project. Technical feasibility as the concept was used by ITC officials meant whether the recipient firm used technology known to the Department. Marketability meant whether the increased production could be sold in Canada and abroad. The response of ITC to these questions was almost always in the affirmative and we did not come across any instances where applications were rejected on the basis of these questions. The more important point, however, is that these questions really had nothing to do with incrementality and therefore, were irrelevant.

Much the same applies to the other questions which the applicants were asked to respond to. Hence it would seem that the information supplied by the applicants could not have served as a useful guide for making the kind of decisions which the administrators of the grants program were called upon to make. No wonder then that virtually all applications were accepted regardless of their incrementality. In fact, many of the federal officials we spoke to could not remember any instances where applications were rejected. Indeed, an examination of about 90 per cent of the company files revealed a few instances where the program administrators solicited applications from firms who were not initially interested in applying.

ALLOCATION OF GRANTS

Another important aspect which is worth consideration is the allocation of grants. It sheds light on the question of how closely the actual allocation was tied to the objectives of the program. If modernization was indeed the major objective of the program, one should observe a close relationship between the age of the mill and the size of grants. Although it has its limitations,[16] the age of the mill provides an indication of the state of technology used. We were able to get this data for 36 mills,[17] which together account for 70 per cent of the modernization grants (Table 4-3). The rank correlation between the age of the mill and the size of the grant was -0.08. A criticism that could be levelled against this test is that it does not isolate other factors relevant to the allocation process. To meet this criticism to some extent, we performed a rank correlation of the age of the mill on G/Q_M, where G is the size of grant and Q_M is mill size. The rank correlation coefficient was only -0.02, thus implying that the age of the mill was not a major factor in the allocation of grants. Hence our findings suggest that modernization was not a major objective of the grants program.

Although not explicitly mentioned as a program objective in any of the subsidiary agreements we looked at, the maintenance of stable employment was generally perceived as an objective of PPMP. This was mentioned by many of the firms interviewed by DRIE in the

context of PPMP. Note, of course, that the behaviour of employment is closely related to the international competitiveness of the industry. We tried to capture the effect of the employment objective on the grants program by including a labour market variable in the regression analysis. The variable chosen was the percentage of the local labour force employed by the mill (LM). Data on this variable was obtained for 19 mills from The Report of the Special Task Force on Ontario's Pulp and Paper Industry, November 1978. The labour market variable (LM), along with QM, was regressed on G/QM. But LM turned out to be statistically insignificant.[17b] This finding suggests that allocation of grants was not linked to the employment objective. The foregoing analysis, although some parts of it are based on a small sample, reveals that the allocation of grants was not closely related to either the objective of modernization of plant and equipment or the objective of maintaining stable employment. Indeed, the preliminary evidence based on our statistical results shows that economic factors have not played a significant role in the allocation of grants.

Canadian Content

Canadian content was an important aspect of PPMP. The incorporation of this feature resulted in the spillage of some of the benefits of the program from the pulp and paper firms to the producers of pulp and paper machinery. To appreciate this argument, recall the earlier theoretical discussion where the imposition of Canadian content legislation led to an increase in the subsidy (see Figure 4-2). However, if there is no increase in the subsidy, there is no real incentive for the firm to buy from domestic producers of parts. This was the problem with the Modernization Grants Program. A firm using 95 per cent Canadian content did not receive a higher grant than one using 75 per cent. Hence the governments had to apply pressure on the firms to observe the Canadian content requirement.

One can sympathize with the two levels of government on their concern for the pulp and paper machinery industry. This is a relatively small industry which employed about 2,400 persons at the time PPMP was introduced.[18] It produces a wide range of products from pulp concentrators to wallpaper making machinery and laminating machinery. Besides supplying parts to pulp and paper, the industry also manufactures parts for pollution abatement and for the mining and steel industries. In 1978 there were about 27 firms in the industry, of which 24 were in Ontario and Quebec and the remainder in British Columbia (Table 4-4). There are no data on firm size but one would suspect the average size to be rather small. A major indicator of the economic health of the industry is its trade balance which was in deficit throughout the 1970-85 period, except for one year (1980) (Table 4-5). About one-half of the imports came from the United States duty-free and most of these were used in the paper converting industry (Table 4-6). Furthermore, about half of the imports during the late 1970s consisted of parts which were imported either for assembly or for

replacement purposes. The bulk of domestic production was for domestic consumption. But because of import competition, the domestic industry was struggling to survive. The problems of the industry included its high cost relative to imports and the reliability of service. A study prepared by ITC[19] reveals that the price of domestically produced machinery and parts was about 14 per cent higher than those made in the United States during the late 1970s.

Thus it is not surprising that the pulp and paper firms showed a preference for imported parts which led to a great deal of protests from domestic manufacturers of pulp and paper equipment to the federal and provincial governments with requests for intervention and culminated in one of the domestic producers of equipment, Beloit Canada Limited suing a Finnish producer, Valmet Oy for dumping.

The complaint by Beloit Canada covered four specific sales of papermaking machinery by Valmet Oy to Canadian pulp and paper firms during the period from September 1, 1979 to May 30, 1981. The Canadian purchasers were MacMillan Bloedel, Crown Zellerbach, Abitibi-Price, and Great Lakes Forest Products. Of these, Crown Zellerbach did not receive any modernization grants, while MacMillan Bloedel's participation in the grants program was restricted to a single grant estimated around $1 million for its Sturgeon Falls Mill located in Ontario. Thus only Abitibi-Price and Great Lakes were the major recipients of modernization grants.

The complainant alleged that by selling at prices below costs, Valmet Oy was trying to make major inroads into the Canadian market. The dumping allegedly caused Beloit Canada to lose orders resulting in reduced employment and profitability. Beloit Canada projected a decline in the demand for new papermaking machines over the next few years and it argued that, in the face of continued dumping, Canadian manufacturers would face the prospect of fewer sales and smaller profit margins. Beloit Canada's charge of dumping was dismissed by the Anti-Dumping Tribunal, as will be shown later.

At the hearing[20] it was mentioned that certain components could not be made in Canada presumably because of their higher costs here than abroad and therefore, frequently the supplier had to source some of the required machine components in foreign countries. In the case of Beloit Canada and another domestic firm, DEW, although it was mentioned that they had formalized licensing agreements with foreign associates and affiliates, their production did run into snags because there were numerous complaints of delivery delays and in the case of DEW, technical problems associated with installation. Another important aspect of the paper machine industry which was discussed at the hearing was the quality of product and service as perceived by users. On this, the Anti-Dumping Tribunal stated that:

> Nevertheless, the user has certain standards regarding both the equipment itself and its product which must be met. These include such things as machine adjustability, accessibility, noise, finish, quality of workmanship, durability, sturdiness and size; product characteristics such as moisture content and "fines retention"; and the manufacturer's "track record". The track record creates, in the words of one witness, an impression of product quality, and embraces such factors as set-up and installation history on previous projects, and ability to engineer in accordance with specifications and on schedule. The producer's use of latest technology and developments, its background of labour and strike history, and its ability to provide necessary service are all important. (Anti-Dumping Tribunal, ADT-7-81, pp. 10-11)

This perception of quality on the part of users had worked to the disadvantage of domestic firms such as Beloit Canada and DEW. Regarding DEW, users did not consider it to be among those "with a fairly recent successful start-up of a complete, new installation which could act as a "showcase" in the marketplace."[21] Moreover, during the mid 1970s when there was a prolonged lack of orders, DEW had reduced its engineering and design personnel which in the minds of the buyers had adversely affected the quality of its products and service. Consequently, it was revealed at the hearing that even when DEW turned out to be the lowest bidder, it was not automatically awarded the contract. In the case of Beloit Canada, in addition to the delivery delays mentioned earlier, it had resorted to the substitution of certain components sourced offshore, without the consent of the purchaser, for components which the purchaser had believed would be sourced in Canada. Such actions did cast doubt about the quality of products sold by Beloit Canada and affected its future business deals.

During the period, 1978-81, when 12 contracts for complete new machines were let, Valmet Oy won four, one went to a Swedish producer, and the remainder to Canadian producers. Of the four won by Valmet Oy, one contract was divided: Valmet Oy was awarded the technologically more complex "wet end", while the calender, winder and reel went to Beloit.[22] This particular contract demonstrates that even when the Modernization Grants Program was in operation, domestic pulp and paper firms preferred to buy foreign products and were trying to work compromise deals with the modernization grants program administrators.

Thus it was not surprising that the Anti-Dumping Tribunal found no evidence of Valmet Oy trying to sell its exports in Canada at prices below costs. The Anti-Dumping Tribunal added that some sales were lost to Canadian producers not as a result of Valmet's pricing policy, but rather because of preferences shown by Canadian pulp and paper companies for Valmet's superior technology (which was reflected in the quality of its products)

and Valmet's reputation for on-time deliveries and smooth startups.

Despite the initial efforts of some firms to buy some of their machinery and parts from abroad, the final estimates show that the Canadian content of their investment programs during the period of the Modernization Grants Program was about 80 to 90 per cent which was in line with the other pulp and paper companies. Thus probably the main beneficiary of the PPMP was the papermaking machinery industry rather than the pulp and paper industry. Some of the paper machinery manufacturers who were interviewed in connection with the grants program were not satisfied with the Canadian content provision and wanted more by way of direct government assistance. They complained about initial start-up problems and lobbied for modernization grants for themselves, but without success.[23]

A glance at Table 4-9 shows that apparent domestic consumption of pulp and paper machinery and equipment increased very rapidly during the first three years of the modernization program -- 1979-81 but dropped thereafter during the recession. The data for 1984 and 1985 shows a recovery. Imports as a per cent of domestic consumption was well over 60 per cent before the modernization program was introduced. In fact, in 1980, the year after the program was introduced, the share of imports in consumption reached a peak of 71 per cent. After that, for the duration of the program, the relative share of imports in domestic consumption was sharply lower, mainly due to the Canadian content provision in the Modernization Grants Program although the exchange rate also may have played a role.

Case Studies

The three case studies we examined provided further confirmation of some of the results reported earlier. Of these case studies, company A is a major forest products firm with a profit performance superior to the rest of the industry during the 1970-80 period. As a result, it was able to undertake and successfully complete a major program of modernization and pollution abatement in one of its mills. This was specifically announced in one of the firm's annual reports. Given the firm's successful record on modernization and pollution abatement, it is doubtful whether it should have received any assistance. Yet it was one of the principal beneficiaries of PPMP. The firm was requested to provide information on the rate of return required to undertake various modernization projects for which it had applied for assistance. But this information was not supplied. Without this information, it is not clear how the program administrators determined the amount of subsidy to be given.

Company B owned several mills. It bought a mill after the previous owner had closed down its operations. The previous owner had received approval for a PPMP grant before its decision to close the plant. The new owner received a grant much larger than

the grant awarded to the previous owner. This is an excellent candidate for a case study because one would like to know the basis for treating the same project differently, despite the change of ownership.

The evidence we were able to uncover revealed that the previous owner really was not interested in applying for a PPMP grant but did so because of the appeals made by the provincial government. But immediately after signing for the grant, it decided to close down the mill and cited heavy losses as the reason for doing so. The provincial government failed to find a new purchaser despite a frantic search. Finally, a buyer was found with a poor financial record, judging by its relatively low profits and extremely high debt/equity ratio. The firm realized its strong bargaining position and was able to obtain further concessions from the governments such as an extension of the deadline for the completion of the project. An examination of its application reveals that many of the questions asked were not answered, including such items as the operating efficiency of the mill, the types of machinery to be installed, and the required rates of return. Overall, there is nothing in the application to suggest that the new owner deserved a higher grant than the previous owner for the same project.

Company C is another major pulp and paper producer. The president of the firm mentioned that it would not close its operations in one of the mills even if it did not receive a grant. Like Company A, this firm also had completed the bulk of its modernization before the grants program. But it too received a considerable amount under PPMP. A glance at its application reveals the same story: much of the requested information was not supplied. There is one specific feature of this company which deserves mention. Because of potential layoffs, the unions resisted the modernization program and went on strike. The problem was ultimately solved with the two levels of government, the firm and the unions signing an agreement providing for advance notice before layoffs and such labour adjustment measures as retraining, early retirement, etc.

SUMMARY AND CONCLUSIONS

Any evaluation of a government program must start with a discussion of the need for government intervention. The classic argument for government intervention is based on the existence of externalities or market failures. We have examined the rationale for government intervention based on externalities in factor and output markets. Since PPMP was a capital subsidy, the only valid rationale for its introduction would be an imperfection in capital markets. But we found that capital markets function relatively efficiently. Hence there does not seem to be a valid rationale for PPMP.

The various statistical tests we have conducted on different aspects of the program may not be conclusive when each of them is considered individually. But when all of the various bits of

information are pieced together and combined with a priori reasoning, they present a fairly convincing story that PPMP failed to meet its objectives.

The main objective of the program was to modernize plant and equipment and make the industry internationally competitive. To realize this objective, the program should have influenced the level of investment of the recipient firms. However, our statistical tests show that the program did not have a significant impact on investment of the firms which received the modernization grants. The evidence also reveals that a dollar of grants failed to generate a dollar of new investment. In other words, the government could not get its money's worth of new investment.

A major explanation for the failure of the program lies in its implementation. PPMP was a firm-specific subsidy program. Such policies are extremely difficult to administer because of the problem of obtaining the required information. Information on two variables is crucial. One is the identification of the marginal firms who will not undertake the investment project without the subsidy. The other is information on differences in the efficiency of each firm, so that the government could determine the exact amount of subsidy which each firm should receive. The government has to rely on the information supplied by the firm and the program administrators have to use a great deal of discretion in interpreting these data. Because of the difficulty in obtaining reliable information, firm-specific policies tend to be wasteful by providing inefficient firms with windfall gains and driving out of business the more efficient firms. The Modernization Grants Program is subject to some of these criticisms. Thus, despite the good intentions of the governments, they were faced from the very beginning with the almost impossible task of properly administering the grants program. The problem lies not with the program administrators but with the inherent weaknesses of the program itself.

The allocation of grants presents another clue to the failure of the program. If modernization was indeed the principal objective, most of the grants should have been allocated to the older mills. But this was not the case. Some have expressed the view that a major implicit objective of the program was the maintenance of stable employment. If the argument is valid, the size of grants should have varied according to the degree of the local labour markets' dependence on the mill. But we failed to find any such relationship. Indeed our analysis cast doubt on the view that the allocation of grants was determined by economic considerations in any systematic fashion.

Canadian content requirement was a major feature of the program. It was included to enable the pulp and paper machinery and parts manufacturers to improve their international competitiveness. But in so doing, two things seem to have happened. First, given that the parts industry is generally inefficient and lacks international competitiveness, it must have raised the costs of

producing pulp and paper in Canada, thus making it more difficult than otherwise for the pulp and paper industry to become internationally competitive. Second, the evidence also indicated that a considerable portion of the benefits of PPMP passed on to the parts manufacturers, thus detracting from the objective of assisting mainly the pulp and paper producers.

Some of the case studies we examined tend to reinforce some of the previous findings. In general, we found inadequacies in the quality and quantity of information supplied by firms applying for grants. The evidence reveals a considerable degree of latitude in the amount of grants awarded to individual plants. Some mills which received grants had already completed their modernization. There were other instances where new purchasers of mills which had previously been closed received considerably more than the previous owners for roughly the same projects. Overall, the evidence based on the case studies points to the enormous difficulties of implementing a program of this nature.

NOTES

1 The rationale for government intervention has been discussed in depth by Michael Trebilcock in several studies. See, for example, M. Trebilcock, The Political Economy of Economic Adjustment: The Case of Declining Sectors (Toronto: University of Toronto Press, 1986), Chapter 1; M. Trebilcock, et al., The Political Economy of Business Bailouts, Volume 1, Ontario Economic Council Research Studies (Toronto: Ontario Economic Council, 1985), Chapters 3 and 4. The present discussion is based on these studies.

2 Abraham Tarasofsky, The subsidization of innovation projects by the Government of Canada, a study prepared for the Economic Council of Canada (Ottawa: Supply and Services Canada, 1984), pp. 8-9.

3 See, for example, L. Wynant, J. Hatch and M. J. Grant, Chartered Bank Financing of Small Business in Canada, (London, Ontario: School of Business Administration, University of Western Ontario, 1982).

4 The unemployment rate in Canada during 1977-78 was about 8.0 per cent, compared with 6.0 per cent during 1970-76.

5 R. Harris et al, "Market Adjustment and Government Policy", Second John Deutsch Round Table on Economic Policy, Economic Adjustment and Public Policy (ed) Douglas D. Purvis (Kingston, Ontario: Queen's University, 1984).

6 See, for example, Paul Krugman, "Targeted Industrial Policies: Theory and Evidence", in Industrial Change and Public Policy, (Kansas City: The Federal Reserve Bank of Kansas City, 1983), pp. 123-169.

7 For an interesting discussion, see A. Alchian and W. R Allen, University Economics, Third Edition (California: Wadswoth Publishing Company, 1972), pp. 242-43.

8 See, for example, Harry G. Johnson, "Optimal Trade Intervention in the Presence of Domestic Distortions," in Trade, Growth and Balance of Payments, Essays in honour of Gottfried Haberler (eds.) R. E. Baldwin, et al. (Chicago: Rand McNally & Company, 1965), pp. 3-34

9 This section and the next section are heavily influenced by Professor Usher's writings. See, for example, Dan Usher, The Benefits and Cost of Firm-Specific Investment Grants: A Study of Five Federal Programs, Queen's University, Department of Economics, Discussion Paper No. 511, January 1, 1983; Dan Usher, A Critique of the Canadian Program of Subsidising Investment in the Less Developed Regions, Queen's University,

Department of Economics, Discussion Paper No. 145, Klaus Stegemann, DREE and Entry, Queen's University, Department of Economics, Discussion Paper No. 144, and Theodore J. Osborne and F. C. Miller, The Impact of DREE Grants on Manufacturing in the Atlantic Provinces, University of Guelph, Department of Economics, Discussion Paper 1980-4.

10 It is assumed here that the financing of the subsidy is through taxation which is neutral in terms of its resource allocation effects.

11 Abraham Tarasofsky, "The Subsidization of Innovation Project," op. cit., p. 13.

12 See the references mentioned in footnote 9.

13 Department of Regional Industrial Expansion, Pulp and Paper Modernization Study: Volume 1, National Report, (Ottawa: DRIE, October 1983), p. VII.

14 The results of our analysis are consistent with two other studies dealing with the impact of R&D tax incentives provided to various industries. See D. G. McFetridge and J. D. Howe, "The Determinants of R&D Expenditures," The Canadian Journal of Economics, February 1976, pp. 57-71 and E. Mansfield and L. Switzer, "How Effective are Canada's Direct Tax Incentives for R&D?", Canadian Public Policy, June 1985, pp. 241-46. These studies find that tax incentives have not had a significant impact on R&D.

15 Robert Andras, "National Development Policy Builds on Previous Plans that have Worked," Canadian Pulp and Paper Industry (Toronto: MacLean Hunter Inc.), May 1979, p. 17.

16 The principal limitation is that if improvements have been made, the age of the mill will not reflect the state of technology used.

17 The source of information on this is Ontario Ministry of Industry and Tourism, The Report of the Special Task Force on Ontario's Pulp and Paper Industry (Toronto: Ontario Ministry of Industry and Tourism, November 16, 1978), Appendix III.

17b The results of the regression analysis can be presented as follows:

$$G/Q_M = \underset{(3.9228)}{9.4572^*} + \underset{(1.8926)}{12.6123}\, Q_M - \underset{(-2.1853)}{2.8520}\, Q_F^{**} - \underset{(-0.6981)}{1.6931}\, L_M$$

$$\bar{R}^2 = 0.0552$$

$$D.W. = 2.44$$

where G = grant;
Q_F = firm size;
Q_M = mill size;
L_M = percentage of local labour force employed at the mill;

t-statistics appear within brackets;
* indicates significance at 95 per cent confidence level;
**indicates significance at 90 per cent confidence level.

18 This discussion draws heavily on the material contained in Ontario Ministry of Treasury and Economics, Economic Development Branch, Office of Economic Policy, Pulp and Paper Machinery and Equipment Industry in Canada, Staff Report (Toronto: Ontario Ministry of Treasury and Economics, March 1979), pp. 1-10.

19 Department of Regional Industrial Expansion, Pulp and Paper Modernization Study, op. cit., p. 7.

20 Anti-Dumping Tribunal, Inquiry Under Section 16 of the Anti-Dumping Act Respecting Papermaking Machines of a Wire Width Exceeding 130 Inches and Components Thereof Originating In Or Exporting From Finland, ADT-7-81, pp. 5-6.

21 Anti-Dumping Tribunal, Ibid, p. 11.

22 The typical paper machine consists of the following major components:

1 The headbox where the stock containing the pulp fibres is delivered to the paper machine;

2 The former where the pulp fibres are formed into a continuous wet web;

3 Press and dryer sections where the continuous wet web of paper is dried by mechanical and thermal processes;

4 Calendars which reduce the paper web thickness and increase surface smoothness;

5 The reels, winders and slitters, where the paper is wound, slit to the desired width and made into rolls and specified diameter for shipment.

The headbox, former and press sections comprise the "wet end" of the machine while the "dry end" comprises the dryers, calenders, reels, winders and slitters.

Source Anti-Dumping Tribunal, op. cit., p. 3.

23 Department of Regional Industrial Expansion, Pulp and Paper Modernization Study, op. cit., p. 31.

Figure 4-1

The Effect of Industry-Specific Vs. Firm-Specific Subsidies

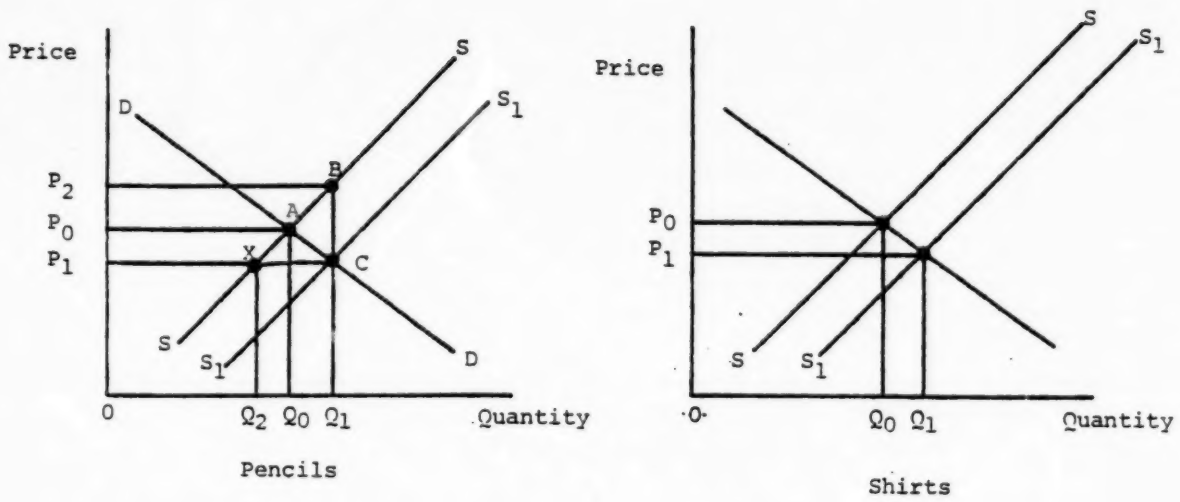


Figure 4-2

The Effect of Domestic Factor Content Protection

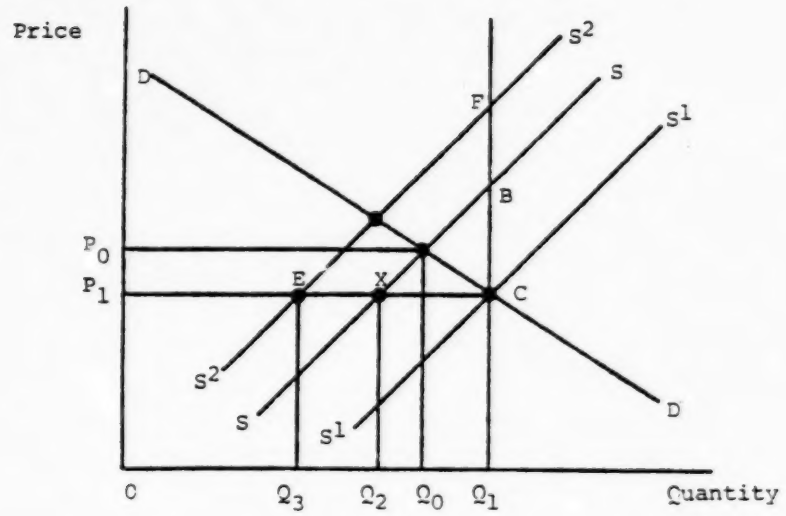


Table 4-1

Likely Impact of Grants Program on New Investment (ΔI)

	Project A			Project B			Total new investment (ΔI)	Magnitude of G variable (ΔI/G)
	Government's contribution	Firm's contribution	New investment	Government's contribution	Firm's contribution	New investment		
Case 1	x	2x	3x	0	0	0	3x	3 (ie. G > 1)
Case 2	x	2x	3x	0	-2x	-2x	x	G = 1
Case 3	x	2x	3x	0	-3x	-3x	0	G = 0

Table 4-2

Results of Regression Analysis

Company A (1961-84)

$$I/P = \underset{(0.0281)}{0.2653} - \begin{matrix}0.0894t \\ 0.0342t\text{-}1 \\ 0.1579t\text{-}2\end{matrix} + \underset{(0.1727)}{0.0606}\,G/P$$

$$0.1026\ S/P^{**}$$
$$(3.2258)$$

$\bar{R}^2 = 0.6707$
D.W. = 1.08

Company B (1964-84)

$$I/P = \underset{(0.9869)}{1.4650} - \underset{(1.1363)}{0.1283}\,G/P + \begin{matrix}0.128^{*} \\ 0.0295t\text{-}1 \\ -0.0694t\text{-}2\end{matrix}$$

$$0.0886S/P^{*}$$
$$(1.9014)$$

$\bar{R}^2 = 0.6304$
D.W. = 2.27

Company C (1961-84)

$$I/P = \underset{(-0.9132)}{-3.1127} + \underset{(5.7154)}{0.1682}\,S/P^{**} + \underset{(0.0752)}{0.0085}\,G/P + \underset{(0.6979)}{0.0223}CU$$

$\bar{R}^2 = 0.6628$
D.W. = 2.12

Company D (1961-84)

$$I/P = \underset{(0.5582)}{0.8155}\,G/P + \begin{matrix}0.2236t \\ 0.0263t\text{-}1 \\ -0.1711t\text{-}2\end{matrix}$$

$$0.0787^{S/P^{**}}$$
$$(14.2506)$$

$\bar{R}^2 = 0.6266$
D.W. = 1.51

Company E (1961-84)

$$I/P = \underset{(-0.9784)}{-0.8066} + \underset{(6.1490)}{0.1589}\,S/P^{**} \underset{(-0.3837)}{-0.0353}\,G/P$$

$\bar{R}^2 = 0.6724$
D.W. = 1.94

I/P = Real investment.
CU = Capacity utilization in paper and allied products.
S/P = Deflated sales.
G/P = Incentive grants in real terms.
t- statistics appear within brackets.
* Significant at 95 per cent confidence interval.
** Significant at 90 per cent confidence interval.

Table 4-3

The Age of Selected Pulp and Paper Mills

Mill Location	Firm	Date of Establishment	Ranking According to Size of Grant
Iroquois	Abitibi-Price	1915	12
Sault Ste. Marie	" "	1895	32
Smooth Rock Falls	" "	1917	31
Thunder Bay	" "	1928	30
Thunder Bay (Port Arthur)	" "	1919	29
Fort William	" "	1922	27
Thorold	" "	1904	28
Kenogami, Que.	" "	1912	26
Chandler, Que.	" "	1937	22
Beaupré, Que.	" "	1927	7
Sturgeon Falls	MacMillan-Bloedel	1900	34
Thorold	Ontario Paper	1913	4
Marathon	James River Marathon	1946	10
Fort Frances	Boise Cascade	1914	25
Kenora	" "	1924	9
Cornwall	Domtar	1883	21
Red Rock	"	1945	15
Trenton	"	1926	33
Espanola	E.B. Eddy	1902	6
Ottawa	" "	1905	30
Dryden	Great Lakes	1915	1
Thunder Bay	" "	1924	14
Kapuskasing	Spruce Falls	1928	19
Atholville, N.B.	Fraser	1930	8
Cornerbrook, Nfld.	Kruger	1924	2
Nakawic, N.B.	St. Anne Nakawic	1975	24
Dalhousie, N.B.	NBIP Ltd.	1929	11
Saint John, N.B.	Irving Pulp	1946	20
Liverpool, N.S.	Bowater Mersey	1928	13
Hantsport, N.S.	Minas Basin	1928	36
Abercrombie, N.S.	Scott Maritimes	1967	18
Clermont	Donohue	1927	5
Baie Comeau, Que.	Q.N.S.	1938	17
Saint John, N.S.	Rothesay	1965	23
Masson, Que.	MacLaren	1902	3
Témiscaming, Que.	Tembec	1920	16

Source Ontario Mills from Ontario Ministry of Industry and Tourism, Report of the Special Task Force on Ontario's Pulp and Paper Industry (Toronto: Ontario Ministry of Industry and Tourism, Nov. 18, 1978), Appendix III; for other mills, company files.

Table 4-4

Major Pulp and Paper Machinery and Equipment Producers in Canada in the Late 1970s

Name of Company	Plant Location	Location of Parent Company	Manufacturer of: Pulp and Paper Equipment	Manufacturer of: Environmental Equipment
ONTARIO				
Port-Arthur Shipbuilding Co.	Thunder Bay	Canada	x	
Canron Ltd.	Toronto	Canada	x	
Greey Mixing Equipment Ltd.	Toronto	Canada	x	x
Barber Greene	Milton	U.S.A.	x	
Bauer Bros.	Brantford	U.S.A.	x	
Black-Clawson-Kennedy	Owen Sound Montreal	U.S.A.	x	
Dorr-Oliver-Long Ltd.	Orillia	U.S.A.	x	x
Envirotech Canada Ltd.	Mississauga	U.S.A.	x	x
Koehring-Waterous	Brantford	U.S.A.	x	
Babcock and Wilcox	Cambridge	U.S.A.	x	
De Zurik of Canada Ltd.	Cambridge	U.S.A.	x	x
Ecodyne Ltd.	Oakville	U.S.A.		x
Rexnord	Toronto	U.S.A.	x	x
QUEBEC				
Dominion Engineering	Montreal	Canada	x	
Hooper, S.W. and Company	Sherbrooke	Canada	x	
Jeffrey Manf. Co. Ltd.	Lasalle	U.S.A.	x	
Beloit Sorel Warmsley Ltd.	Pointe Claire	U.S.A.	x	
Canadian Ingersoll Rand	Sherbrooke	U.S.A.	x	
Forano	Plessisville	Canada	x	
Allis-Chalmer Canada Ltd.	Lachine	U.S.A.	x	
Albany Engineering Systems Canada Limited	Pointe Claire	U.S.A.	x	
Midland-Ross (Ross Air System Div.)	Lasalle	U.S.A.	x	
Sunds	Montreal	Sweden	x	
BRITISH COLUMBIA				
Esco Ltd.	Vancouver Port Hope	Canada	x	
CAE Machinery	Vancouver	Canada	x	
Chapman Industries	Vancouver	Canada	x	
Mainland Industries Limited	Vancouver	Canada	x	

Source Ontario Ministry of Treasury and Economics, Economic Development Branch, Office of Economic Policy, Pulp and Paper Machinery and Equipment Industry in Canada, Staff Report (Toronto: Ontario Ministry of Treasury and Economics, March 1979), Appendix 5, pp. 16-17.

Table 4-5

Canadian Pulp and Paper Machinery Equipment Industry, 1970-85

	Output	Exports	Imports	Apparent Consumption	(3) as a % of (4)
	(1)	(2)	(3)	(4)	(5)
	In constant (1985) dollars				
1970	235.6	42.5	187.5	380.6	49.3
1971	193.6	36.1	136.1	293.6	46.4
1972	132.6	48.3	125.0	209.3	59.7
1973	152.2	47.6	106.2	210.8	50.4
1974	212.5	77.6	145.3	280.2	51.9
1975	260.4	63.3	180.9	378.0	47.9
1976	209.0	69.9	135.1	274.2	49.3
1977	168.8	87.1	145.1	227.4	64.1
1978	227.8	144.4	145.1	228.5	63.5
1979	277.7	180.3	182.8	280.2	65.2
1980	371.5	283.3	215.1	303.3	70.9
1981	516.0	114.6	295.4	696.8	42.4
1982	349.9	103.3	223.5	470.1	47.5
1983	262.5	73.3	150.3	339.5	44.3
1984	298.9	77.9	196.8	417.8	47.1
1985	343.2	169.4	282.8	456.6	61.9

Source Data provided by Machinery and Electrical Equipment Branch, DRIE.

Table 4-6

Imports of Pulp and Paper Machinery by Type, Canada, 1968-77

Year	Value of Imports					Per Cent of Total				
	Pulp Mill Machinery and Parts	Rolls	Paper Mill Machinery and Parts	Paper Converting Machinery and Parts	Total	Pulp Mill Machinery and Parts	Rolls	Paper Mill Machinery and Parts	Paper Converting Machinery and Parts	Total
	(Thousands of current dollars)									
1968	5,034	1,563	7,805	20,493	34,895	14.4	4.5	22.4	58.7	100.0
1969	8,554	1,784	10,792	19,981	41,111	20.8	4.3	26.3	48.6	100.0
1970	12,346	3,298	26,222	20,795	62,661	19.7	5.3	41.8	33.2	100.0
1971	14,753	2,114	18,061	16,533	51,461	28.7	4.1	35.1	32.1	100.0
1972	8,346	2,084	13,707	20,387	44,524	18.7	4.7	30.8	45.8	100.0
1973	7,468	2,079	8,439	22,421	40,407	18.5	5.1	20.9	55.5	100.0
1974	10,840	3,439	15,062	33,728	63,069	17.2	5.4	23.9	53.5	100.0
1975	19,891	3,856	20,445	43,540	87,732	22.7	4.4	23.3	49.6	100.0
1976	16,518	2,332	19,236	32,031	70,117	23.6	3.3	27.4	45.6	100.0
1977	26,019	3,291	14,398	36,940	80,648	32.3	4.1	17.8	45.8	100.0

Source Ontario Ministry of Treasury and Economics, Economic Development Branch, Office of Economic Policy, Pulp and Paper Machinery and Equipment Industry in Canada, Staff Report (Toronto: Ontario Ministry of Treasury and Economics, March 1979), Appendix 5, pp. 5.

5 SUMMARY AND CONCLUSION

The objective of this study is to assess the impact of the Modernization Grants Program on the pulp and paper industry. This is part of a broader project dealing with firm adaptation to trade pressures and opportunities in the manufacturing sector.

Policies which try to improve productivity by moving resources from declining or declining growth sectors to faster growing sectors are referred to as adjustment policies. Although pulp and paper is not a declining sector in the sense that there was no contraction in its levels of output and productivity, there is some justification for considering the Modernization Grants Program as an adjustment policy because the industry did experience a sustained decline in demand and production growth during a large part of the 1970s and the 1980s, and the grants program was introduced to encourage firms to improve their productivity and international competitiveness. In short, the program was designed to facilitate the pulp and paper industry to adjust to changing trade conditions. Whether this objective was met is a different story, to which we will return later.

Chapter two sets the stage for an evaluation of the Modernization Grants Program by presenting an overview of the Canadian pulp and paper industry. The main conclusions of this overview are the following. First, whereas during the 1960s and early 1970s the pulp and paper industry expanded rapidly, during the 1974-1983 period there was a slowdown in the growth of exports, output, employment, investment and productivity.

Second, contrary to popular thinking, capital shortage was not a factor in the labour productivity slowdown. Instead, the main causes were the decline in demand and the energy price increase. Third, the decline in productivity growth combined with rapid wage escalation contributed to a deterioration in the international competitiveness of Canadian pulp and paper exports, although the depreciation of the Canadian dollar relative to the U.S. dollar during the latter part of the 1970s and 1980s tended to offset some of this deterioration in the case of Canadian exports to the United States.

Fourth, neither the productivity slowdown nor the erosion in international competitiveness is unique to the pulp and paper industry. These changes appear to have been pervasive, affecting virtually all industries in Canada. Nor was pulp and paper the worst affected by these changes. Moreover, these developments seem to have plagued other advanced industrial countries too.

Fifth, one should not hastily conclude from the above discussion that the rates of return on investment in pulp and paper must have been low. On the contrary, the available evidence reveals that profit rates in paper and allied products had experienced a significant increase at the time PPMP was set up. Furthermore,

the evidence indicates that at the time PPMP was introduced the pulp and paper mills in Ontario and Quebec enjoyed higher rates of return than their counterparts in the southern United States with whom they are in direct competition.

Sixth, the Canadian pulp and paper industry has been and still is a major recipient of government subsidies. Its marginal effective tax rate is the lowest in the manufacturing sector; its share of regional development grants is the highest in the manufacturing sector; also, it is one of beneficiaries of export financing subsidies offered by the government.

Chapter 3 describes the circumstances leading to the establishment of the Modernization Grants Program and its main features. Faced with the problem of declining demand, the pulp and paper firms approached the two levels of government for assistance. The result was a cost-sharing agreement between the federal and provincial governments, which came into existence in 1979 and lasted until 1984. Under this program approximately $550 million (current dollars) of grants was given to the pulp and paper industry. All major pulp and paper producing regions except British Columbia participated in the program. The principal beneficiaries were Ontario and Quebec despite the fact that they were the two provinces to experience the smallest slowdown in output and productivity growth during the 1974-79 period. The grants program benefitted the bulk of the pulp and paper industry in the East. Only a few mills accounting for about 20 per cent of total pulp and paper capacity in eastern Canada did not receive grants. About 70 to 75 per cent of the grants was allocated to modernization, 15 per cent to pollution abatement, and the remainder to energy conservation. The program also included a provision for Canadian content protection, according to which the recipients of grants were required to purchase their machinery and equipment from domestic sources.

At the time the grants program was introduced, the federal government gave several reasons for assisting the pulp and paper industry. First, since the industry had experienced an erosion in international competitiveness, it was felt that an injection of capital via modernization grants would boost productivity and restore international competitiveness to its previous level. But in view of the fact that capital had played only a minor role in the productivity slowdown during the 1974-80 period, the above optimism seemed unwarranted.

A second argument for giving grants was that the pulp and paper industry is subject to cyclical swings. But this is not a valid argument for intervention because cyclical effects are of a temporary nature and do not require correction by the government in the form of modernization grants.

A third argument for government intervention was that because of declining rates of return on investment, pulp and paper firms were

finding it difficult to undertake investment in modernization, pollution abatement, and energy conservation. However, as we have seen, profitability had increased considerably at the time of the PPMP, and at least in the province of Ontario, firms had already undertaken considerable investment in modernization, pollution abatement and energy conservation.

Chapter 4 deals with the evaluation of the grants program. It starts out by posing the question whether there really was a problem in the pulp and paper industry and if so, whether PPMP was the appropriate policy instrument. To answer these questions, the chapter focusses on the rationale for intervention. Various market imperfections were looked at, particularly those originating in capital markets since PPMP was a capital subsidy. The general conclusion is that capital markets function reasonably well and there was no case for government intervention in the form of PPMP on that score. We also took into account the fact that many of the pulp and paper mills are located in single industry communities and hence the social costs of unemployment which could arise from plant closures. It was argued that while a temporary subsidy may be justified in some instances because of congestion externalities in labour markets, there is at the same time the potential danger that such subsidies may end up impeding adjustment. In general, it was concluded that the solution to many of these problems lies in labour market adjustment policies designed to encourage labour mobility in which the government has a legitimate role to play.

The program was severely criticized from its inception. A frequently mentioned objection was that the program penalized firms which had undertaken investment at their own expense and rewarded those who had postponed investment in anticipation of government grants. Some questioned the need for assistance at a time when profitability was on the increase in the pulp and paper industry. Others felt that the program financed projects which would have been undertaken even without grants. Some remarked on the vagueness of the criteria for the selection of projects which they thought placed excessive reliance on bureaucratic discretion. Some even challenged the legal basis for the grants program. The Law Reform Commission (1986) felt that the legal authority for giving grants was very vaguely defined. The Auditor General's department pointed out irregularities in the payments procedure. Although federal funds were to be paid on an installment basis at the termination of each phase of a project, the Auditor General's department found some instances where federal money was paid up front. Some expressed concern over the potential consequences of the program on capacity utilization in the pulp and paper industry. Given the low capacity utilization rates experienced in the industry during the late 1970s, there was concern that the program would result in excess capacity. Finally, labour was also unhappy because of the potential employment losses resulting from the program.

We also looked at the argument that government assistance could transform an industry which is currently not competitive into one which would be competitive in the future. But this argument is also not convincing. In the absence of government intervention, some pulp and paper mills would have closed down while others would have been modernized at a speed dictated by market forces. By giving grants, the government was encouraging investment at a rate faster than that determined by the market, which in turn could have led to excess capacity, a further fall in prices and profits. Thus forcing an industry to adjust to economic changes at a rate faster than that dictated by the market is as bad as not making the adjustment at all.

The main conclusion which emerges from this review of the rationales for intervention is that the case for PPMP was very weak.

Chapter 4 then proceeded to address the issue of whether PPMP was able to realize its objectives. The most important objective was to modernize the pulp and paper mills and raise their international competitiveness. Hence the logical starting point of the analysis is to examine the impact of the program on the investment performance of the industry. The empirical analysis contained in Chapter 4 reveals that the the Modernization Grants Program did not have a significant impact on the total investment of recipient firms. Moreover, the evidence shows that the magnitude of the impact was also very small, implying that a dollar of grants produced much less than a dollar of investment. How can one explain the lack of a significant impact? One is that there was no valid rationale for the program. Another explanation is that the recipient may have increased investment in pulp and paper operations at the expense of other investment. If this happened, the increase in total investment is zero, although pulp and paper investment has increased. We have not been able to check the validity of this hypothesis because of the lack of data. Thus this is an area for further research.

A major reason for the lack of success of PPMP was its implementation. Government policies fall into three categories - general, industry-specific, and firm-specific. The Modernization Grants Program belongs to the last category since it is applied to selected firms in the industry. Before the grant is given, the government must identify who the marginal producers are. Specifically, the government must find out which firms would undertake a given investment project without government assistance and which firms would not. To obtain this information, governments often rely on the questionnaire method. The standard application form for modernization grants requested information from each firm on a number of issues. One of them was whether the applicant would have undertaken the project if the grant was not given. Another question was how much government assistance was needed to undertake the project. One problem with these questions was the obvious temptation for the applicant to bias the information in his favour to get the maximum grant. But, leaving

that aside, the most that can be expected from this questionnaire is whether the project would have been undertaken by the firm if the grant was not given - i.e. whether the investment is incremental to the firm. The questionnaire cannot shed any light on whether some other firm in the industry or elsewhere in the economy would have undertaken the project without the grant - i.e. whether the investment is incremental to the industry and the economy. Incrementality to the economy should have been the major concern of the policy makers. Unfortunately, the questionnaire method is a poor way of handling this issue. As a result, the selection of grantees is left to the discretion of bureaucrats and the propensity to err increases. Inefficient firms are subsidized, thereby driving the more efficient firms out of business. Thus there is considerable doubt regarding the ability of a grants program to lead to an increase in investment over an above the levels which would have been achieved in its absence.

The three case studies discussed in Chapter 4 show that even the information requested in the questionnaire, however faulty it may be, was not available to the program administrators to make a decision as to who should receive the grants and by how much. In many cases, the information provided was incomplete. No wonder then that virtually every applicant was given a grant. The case studies show that in some cases, the applicant had already undertaken the modernization of the mills before the PPMP was established. And in several instances, subsidies went to mills with a losing track record in terms of their sales and profitability.

One of the issues discussed in Chapter 4 is the allocation of grants. If government grants were given for modernization of mills, then the older mills should have received a larger proportion of the grants. But the statistical analysis shows no relationship between the age of the mill and the size of grant. Similarly, if one of the objectives of the program as perceived by some of the participants was the promotion of employment, then there should have been a significant relationship between the size of grants and the dependence of the local labour market on pulp and paper mills. Once again, however, the statistical analysis could not detect a significant relationship between these variables. In short, the evidence suggests that the allocation of grants was not determined by economic considerations. We have not examined the importance of non-economic factors in the allocation of grants. This is area for further research.

One of the features of the grants program is its Canadian content protection. Given a free choice, pulp and paper firms would have preferred to buy their machinery and equipment from abroad because of its superior quality, reliability of service and lower price. However, because of the Canadian content requirement in PPMP, about 80 to 85 per cent of the machinery and equipment was bought from domestic sources; in some cases, the proportion was much higner. This emphasis on Canadian content protection had two significant results. First, it shows that one of the

principal beneficiaries of the program was the pulp and paper machinery and equipment manufacturers. Second, the emphasis on Canadian content raised the cost of production of pulp and paper above the level that would have prevailed otherwise and thus undermined the program's objective of improving productivity and international competitiveness of the pulp and paper industry.

To sum up, there are five major conclusions of this study. First, there was no economic justification for the Modernization Grants Program. Second, the program failed to meet the objective of modernizing the pulp and paper mills and improving their international competitiveness. The evidence shows that the program did not have a significant impact on investment of the recipient firms. Third, the allocation of grants was not based on economic considerations. Fourth, the magnitude of the impact of the grants program on investment was very small and less than one, thus implying that a dollar of grants failed to generate a dollar of new investment. Fifth, the program also benefitted the pulp and paper machinery industry which was generally inefficient and not internationally competitive. Some of the statistical tests on which the foregoing conclusions are based suffer from several weaknesses, many of which are due to data limitations. Thus these findings should be treated as tentative. However, they are in general agreement with the evidence we have been able to collect in the course of our examination of files of some 90 per cent of the firms which applied for assistance and with the evidence from the three case studies we looked. Thus the sum total of the evidence we have been able to amass seems to convey the message that the grant program which was based on a strategy of targetting funds only to selected projects or picking winners simply did not work.

These findings should not come as a surprise to anyone who has examined the literature on adjustment policies, because much of the evidence suggests that capital subsidies to encourage modernization are in fact policies designed to maintain the status quo and not to encourage adjustment. This, however, does not mean that the government has no role to play in the adjustment process. There are several ways in which the government can encourage the movement of resources from low productive to high productive sectors. This can be done by removing some of the impediments to factor mobility. With regard to capital, it can eliminate or modify, for example, unduly restrictive anti-trust policies toward firm mergers, restrictions on foreign takeovers or mergers, provincial securities law that imposes costly conditions on takeover bids through "follow-up offer" requirements, and tax policies that restrict the ability of acquiring firms to claim accumulated losses incurred by firms which have been taken over.

With regard to labour, many countries including Canada have instituted schemes offering partial compensation to unemployed workers for the social and private costs imposed by their redundancy. Socializing the costs of adjustment has the advantage of tempering the resistance of labour to structural adjustment and

that has worked well in several countries. Canada has also employed sector-specific labour adjustment policies in footwear, textiles, coal mining and automotive industries but they have had only limited success mainly because of their stringent eligibility criteria and low level of benefits. One country which has been most successful with its labour adjustment policies is West Germany. Its success is mainly due to the following features.[1] First, the coverage is universal which has helped the government to dispense with the need to set up complex eligibility criteria. Second, there are severe penalties for unemployed workers for not undergoing retraining. Third, there is a clear separation of the program of aid to unemployed workers in cyclically depressed sectors from the program which dispenses aid to unemployed workers in structurally depressed sectors. Consequently, there is little danger of unemployed workers form cyclically depressed sectors having to undergo costly retraining they do not need, or of unemployed workers from structurally depressed sectors with highly specific skills not qualifying to receive skill retraining. These are some aspects of labour adjustment that Canada should look at so that it could improve the measures already in operation.

NOTES

1 M. Trebilcock, The Political Economy of Economic Adjustment: The Case of Declining Sectors, Chapter 8 (Toronto: University of Toronto, Press, 1986), pp.271-191.